REPORT

OF THE

PROCEEDINGS AND RECOMMENDATIONS

OF THE

EIGHTH ANNUAL BLISTER RUST CONFERENCE

HELD IN

BOSTON, MASSACHUSETTS, FEBRUARY 8, 9, 10, 1923.

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White Pine Blister Rust Control - Our Objective and Its Attainment

by

Dr. Arthur Gilbert, Commissioner,
Massachusetts Department of Agriculture.

Introductory Remarks

As chairman of the American Plant Pest Committee, I am glad to welcome you to this conference as co-workers in a problem of immense importance. Upon such an occasion as this, we may well recall the experiences which we have had with the pests which have come to us from other lands, - the gypsy moth, the brown tail moth, the boll weevil, the European corn borer, the chestnut bark disease, and blister rust - and take advantage of the opportunity to stop - look - and reflect upon such experiences. In our encounter with many of these pests, what has been the outstanding fact? We have in many cases sown the seeds of procrastination and suffered the penalty, in the loss of the chestnut, in the enormous expenditures which have been necessary to fight the gypsy moth, and in the continued spread of other pests of economic importance. Similarly with blister rust, the public has been hesitant; we have delayed, but the time is ripe when we should sow the seeds of precaution and profit by the experiences of the past.

It is hardly necessary to remind you of the fact that blister rust is apparently with us for all time - others will bring you new records of the seriousness of the situation, at least in local areas, - and will impress upon you the necessity for a renewed effort to prevent the further spread of the disease. With the discovery of blister rust in the Pacific northwest, the problem becomes even more national in scope than ever before.

The history of blister rust work until very recently has been of an experimental and investigative character, but today, careful studies

have determined the best methods of control, the practice of control measures has been found effective, experience has increased efficiency and reduced costs, and we are ready to sell our goods. The problems are still legion, and with the adoption of the Educational Plan new ones have arisen. It is for a frank discussion of these problems that this conference has been called; to take stock of progress made, to settle points of disagreement and to make effective plans for the immediate and the distant future.

Our objective - our aim:

What is our objective? In a word, the aim of the present effort in blister rust work is to aid in the protection and in the perpetuation of the white pine as a timber crop, and

First - To be certain that every last pine owner is informed concerning blister rust and is properly advised as to how he can best protect his pine.

Second - To see that everyone in the community is informed of the situation and made to appreciate their direct concern in the pine crop.

Third - To so impress everyone with whom we come in contact with the importance of our message and our service that the pine areas in the eastern and lake states will effectively be cleared of Ribes in the shortest possible time.

Fourth - To provide also for the voluntary re-eradication of Ribes without state or federal aid after our present campaign will have been completed.

Fifth - To so conduct our work that the present white pine crop will be preserved and in addition to stimulate the

production of more and better pine crops and other forest crops, by the practice of the best forestry methods.

There may be and properly so - sincere differences of opinion as to the extent to which and the best method by which, a pine owner can be assisted with his individual problems, but all will agree that the proper and prompt dissemination of vital information is an obligation which the federal and state authorities must fulfill. In this connection, there arises the question of "How far should the blister rust agent preach forestry," a question to which your attention should be carefully directed at this conference.

The accomplishment of our objective

Our aim, - the perpetuation of white pine as a crop - should be clear, - its attainment is replete with problems old and new, the discussion of which will engage your attention today.

As with the solution of any problem, the fundamental requirement is the preparation of a plan and so in blister rust work, there is a vital need of definitely formulating a policy, a plan for the conduct of the work, not only in each state, but in each definite pine growing district. Such a plan should not only provide for the dissemination of information that will lead to the protection of the pine and the growing of more and better forest crops, but it must provide for the accomplishment of our objective in the shortest possible time. Appropriations for the conduct of the work will not be granted indefinitely. Better organization will come from securing the facts on our individual problem, analyzing the data, and planning a selling campaign to make our knowledge of practical value to the pine owner, the currant grower, the lumberman, and everyone in the community.

The successful solution of any problem depends ultimately upon the maintenance of a real spirit of cooperation among those who have a vital interest in its solution. This is particularly true with blister work and the success which has been attained in the past is due in large measure to the splendid spirit of helpfulness developed through associations together and just such meetings as this. May such a spirit ever continue as we strive on toward our goal.

White Pine and the Blister Rust

by

Samuel T. Dana, Forest Commissioner, Maine.

White pine is by all odds the most important tree of southern Maine. It covers a larger area, is used for more purposes and brings a far larger return than any other tree in that part of the State. Its management as a permanent crop, both on farm woodlots and on wild lands, is essential to maintain the prosperity of the region. Action by individual owners in this direction must be stimulated by the State and to a large extent undertaken under its direct leadership.

Management of white pine as a crop involves its protection from fire, insects, and disease, and the use of methods of cutting, in some cases accompanied by planting, which will result in securing the continuous production of well stocked stands. Efforts in the direction of better fire protection are being made, which involve both changes in the present wholly local administration of fire protection activities and increased appropriations. Efforts are also being made to make possible the continuation of the investigations now under way in insect control, and particularly to

secure the application of control measures through educational work among timberland owners. Improved methods of cutting must be brought about largely by educating the timberland owners, although this may in time be supplemented by some form of public regulation of private cuttings. I believe that, in order to make educational work of this sort really effective, we should work towards the employment of county foresters who would perform in the field of forestry the same function performed by the present county agricultural agents in the field of agriculture. These men should preferably be under the control of the State Forester, although they should naturally work in close cooperation with the agricultural extension agencies in the State.

The control of the blister rust is one of the most urgent steps in placing the production of white pine on a crop basis. The disease is now prevalent through the white pine area in the southern part of the State, and occurs at least scatteringly far to the north and east. If not already present throughout the entire State, it undoubtedly will be within a few years. The more firmly it becomes established the more rapidly it spreads. Every year lost in combatting the disease effectively means just so much more loss of pine. The cardinal principle of the present blister rust policy in this State is that the State, with such Federal and town aid as may be available, will handle the necessary educational, scouting, and supervisory work, but that the actual eradication of ribes must be done by the private owner at his own expense. Experience during the past year has indicated that private owners, after proper instruction, can be relied upon to do this effectively. Existing legislation makes it possible for the Forest Commissioner to designate areas within which all ribes, both wild and cultivated, must be eradicated, and to do the eradication

himself at the expense of the town in case the eradication is not handled by the owner within the time specified.

During the present winter four educational agents are being employed in five counties in the southern part of the State. It is anticipated that the interest which they are arousing will result in considerably increased town appropriations, and every effort is being made to encourage such appropriations. Efforts are also being made to increase State appropriations with a view to hastening the control work as much as possible. During the field season each educational agent will have the services of several assistants who will work in individual towns. They will handle the necessary preliminary scouting and throw out areas in which eradication is unnecessary; will enlist the cooperation of private owners through personal interviews; and will instruct them in effective control methods. The aim will be to clear up each town as rapidly as the funds available permit and to cover all property within the portion of the town worked during any given season. All towns being worked will be designated as eradication areas within which all ribes must be removed within the time limit fixed. Town funds may be used either to supplement State and Federal funds for educational and supervisory work, or for the employment of local foremen.

I should like to see a program adopted which would cover all of the more important pine producing sections in the southern part of the State within the next ten years, but am afraid that the necessary funds for the work will not be forthcoming. However that may be, we should look forward definitely to completing the work as rapidly as possible. When the area has been covered once, the necessary followup work should be handled by the county foresters, referred to above in connection with forest extension work. After the present emergency has been met, the control of blister

rust should be looked upon merely as one of the factors to be taken into consideration in producing the white pine crop. Moreover, during the emergency the men assigned exclusively to blister rust control should as an integral part of their work do what they can in the way of arousing interest in white pine production and in stimulating its management as one of our important crops.

No attempt will be made to eradicate the ribes in those sections in the northern part of the State where the abundance of ribes and the relative scarcity of white pine would make the cost of control prohibitive. In such areas the disease should be allowed to take its course and other species allowed to take the place of pine, as they gradually will of their own accord.

To summarize, the State's policy in regard to blister rust control is as follows:

1. So far as funds permit, the State, in cooperation with the Federal Government and individual towns, will take the leadership in educational, scouting, and supervisory work. A definite effort will be made to secure increased town assistance.

2. The actual eradication of currants and gooseberries must be done by private owners at their own expense. To make certain that this is done effectively, specific eradication areas will be proclaimed, within which property not properly eradicated will be cleaned up by the Forest Commissioner at the expense of the town. In addition, all work done by private owners will be checked by State or Federal agents prior to approval of the work.

3. The entire area in which white pine is of primary commercial

importance should be covered as rapidly as possible. This work should preferably be completed in ten years, and at the outside in twenty years. No attempt will be made to control the disease where ribes is so abundant and pine so scarce as to make the cost of control prohibitive.

4. After the entire pine area has been covered once, the necessary followup work will be handled by county foresters who will include this as an integral part of their work of stimulating forest production and securing the introduction of improved methods of management.

5. In connection with the blister rust work every effort will be made to emphasize the importance of white pine in the agricultural and industrial life of the State and to encourage its management on a crop basis. Planting of white pine will be encouraged, with warning as to the necessity of blister rust control, as will also more adequate protection from fire and insects and the application of better methods of cutting.

State Policy Governing Blister Rust Control In New Hampshire.

by

L. E. Newman, State Leader.

In view of the fact that the greater portion of the soil in New Hampshire is better suited to forest growth, and furthermore, inasmuch as white pine seems to be the best all around species for the larger portion of the state, the Forestry Department believes that everything possible should be done to protect an asset to the state which has been valued at no less than $50,000,000.

Since the inception of Blister Rust Control in 1918 in New Hampshire, the Forestry Commission's policy has been molded along the lines - first, cooperation with towns and cities and secondly, with individual pine owners. The State Forestry Department believes that while the individual owner should not be overlooked and that where interest in shown by some owners, they should be encouraged in every way, still, in view of some five years of control work, it is felt that cooperation with towns and cities, permitting, as it does, work over large areas, is the most economical and effective means of handling the matter. In view of this statement, there does not seem to be any logical reason for changing the present policy during the coming year.

During the coming eradication season, the State Forestry Department plans to assist towns and cities by increasing their appropriations 25%, and as recommended in the majority of cases, an appropriation of at least $400 has been recommended as a minimum amount with which control work can be effectively conducted over any considerable area. The State will also pay 25% of the cost of control work on individual owners' lands. Where a pine owner has labor of his own, the State will, in most cases, furnish a competent foreman.

The State Forestry Department feels that the planting and culture of white pine should be continued, realizing, of course, that protective measures against Blister Rust should form a part of the management of this crop.

Blister Rust Policy in Massachusetts

by

H. O. Cook, Chief Forester, and C. C. Perry, State Leader.

The authority for the conduct of blister rust control work in the State of Massachusetts, is vested in the State Department of Agriculture, while the forestry policy of the state, is determined by the State Department of Conservation.

The policy of the State Department of Conservation is to at all times encourage the planting and proper management of white pine, as the leading forest crop of the state. In order to take precautions against the blister rust, the department is gradually making intensive examination of all state lands under its jurisdiction and eradicating Ribes wherever they are a menace to white pine. The department has recently adopted the policy of referring to the Department of Agriculture a list of all parties purchasing white pine planting stock, in order that examinations may be made of planting sites and the owners advised regarding the necessity of eradicating Ribes as a protection to pine.

The policy of the State Department of Agriculture, is as follows:

1. To continue the intensive educational program as inaugurated in 1922, in cooperation with the Office of Blister Rust Control U. S. Department of Agriculture, and the Extension Service. The prime object of this campaign is to be certain that every pine owner is informed concerning blister rust and advised how he can properly protect his pine.

2. To conduct wherever and whenever practicable, demonstrations of the disease and the damage it may do and the methods whereby its further spread can be prevented.

3. To assist as many individual pine owners as funds will permit, by giving intensive instruction in eradication methods, to the extent of scouting a property and furnishing the owner with a trained foreman for a limited period or until such time as he may be able to handle the work himself.

4. To discourage the further cultivation of Ribes in white pine growing sections.

Looking Ahead In Rhode Island.

by

R. A. Sheals, Assistant State Entomologist

Rhode Island in 1917 adopted the policy of eradicating all ribes both wild and cultivated, whether infected or not, from any control areas that might be selected. The areas to be eradicated were to be chosen according to the amount of white pine on the land. Soon it was deemed advisable to extend the eradication of ribes to cover all potential white pine forest land. This policy will enable us to advocate a reforestation proposition soon in which white pine will play a large part. Speaking approximately, this eradication area will include all that land west of the main line of the New York, New Haven and Hartford Railroad.

Rhode Island at the present time imports probably 80% of all the lumber it uses. A considerable quantity of this lumber is pine, spruce, or other soft woods. There is no reason why Rhode Island could not produce at least 75% of all its timber needs. Of course such results cannot be attained during the present generation but it furnishes a goal toward which we are striving.

In any reforestation plan in the eastern states, white pine will necessarily play a leading part. However, at the present time, I do not feel justified in advocating planting large areas of white pine in pure stands but consider it good insurance to use a mixture of white and red pine, or possibly white and scotch pine. My reason for not recommending pure stands of pine trees is not in fear of blister rust alone but also to as much fear of weevil injury. While the weevil does not in most instances kill the tree it certainly does cause great injury. First class white pine lumber is not cut from weevil damaged trees except possibly in box board and veneer lengths. The weevil does not threaten white pine, the way in which blister rust does, but we should not advocate the planting of pure stands of white pine without putting the possibility of weevil injury squarely before the public.

Blister Rust Problems.

The blister rust problems in Rhode Island as I see them, are:
1st. To obtain sufficient money with which to carry on eradication work.
2nd. To hire the right kind of men for the eradication work.

The main source of the money supply should come from the State and Federal Departments. Some private funds have already been raised and more will be obtained in the future. These funds will be comparatively small and cannot be depended upon. The proposition of inducing land owners to furnish their own labor for eradication purposes will not be strenuously urged in Rhode Island unless conditions of white pine infection change greatly in the next few years. We believe all eradication should be done by trained men under state supervision. The scout method is the only practical system of eradication for Rhode Island. Any other method is al-

together too expensive to be practical. Trained men are needed. Individual responsibility and a good knowledge of Rhode Island rural conditions are required.

The problem of transportation is always present. This year we are planning to transport the men a distance of eight to fifteen miles daily (one way) in order to keep trained men on the job. It is a question to what distances it is advisable to transport trained men so they will be available for the work. We have at the present time in Rhode Island an exceptional crew of trained scouts. If we can by any method retain these men until eradication of all our contemplated area has been completed once our chief problem will have been solved.

Connecticut Blister Rust Policy

by

W. O. Filley, State Cooperator.

The policy of any state regarding control of blister rust and the growing of white pine as a future timber crop must be based primarily on local conditions. In regions whose future industrial welfare is recognized to depend on the growing of white pine as a crop, there can be little question concerning the desirability of organized community effort to protect the pine from disease, provided the practicability of such work can be proven in advance. Conversely, it is hardly to be expected that regions in which white pine as a crop is not of economic importance, or in which its importance is not recognized, will respond as readily to an appeal for its protection by methods, the effectiveness of which is difficult to demonstrate.

In the larger part of Connecticut, conditions differ greatly from those in northern New England. While white pine is an important raw material in our industries, as a timber crop its importance is not so universally recognized in Connecticut as in the states further north. Furthermore, although white pine is found growing naturally in commercial quantities in about 30% of the state's total area, it is only in the northwest corner, in an area of less than 300,000 acres, that white pine and wild ribes species are found growing together in abundance.

The total pine region of Connecticut is approximately 950,000 acres but of this area only 626,000 acres is forest, and less than 200,000 acres of this contains pine in quantity. The pine-ribes section of Litchfield County is less than one-third of the entire pine region of the state. It contains about 170,000 acres of forest, of which not more than 60,000 acres contains pine in any quantity and only 13,000 acres of this is pure pine. The total present stand of white pine for the entire state is estimated to be 150,000,000 B. F., of which at least one-third is in Litchfield County, where is located less than one-fourth of the forest area of the state but nearly one-third of the pine acreage.

Our problem, therefore, presents two phases which necessitate two somewhat different policies. Throughout the pine region the appreciation of the value of pine as a timber crop is sufficiently great to assure the interest of most owners in its protection, provided they can be convinced that protection is needed and that it is practicable. On the other hand, it is only in the pine-ribes region of northern Litchfield County that the pine seems to be in any great danger from the rust at present, and in general it is only in this section that the interest is keen enough to be transformed into action.

Consequently, our policy of intensive ribes eradication is confined to this section. As at present determined, it is one of cooperation between communities and the State rather than between individuals and the State. Local funds, raised either by town appropriation or by subscription, are practically matched by state funds, although in practice it has been found best to use local funds mainly for labor. Where private land owners prefer to clean up their own land, such work is supervised by state men and tied into the general control plan for the community.

In the two thirds of the state outside the pine region, the problem is one of protecting small isolated native stands and plantations (either forest or ornamental) by eradicating cultivated species of ribes from the immediate vicinity. The policy is therefore one of education, with careful scouting of pine stands and plantations, and cooperation with individual owners to the extent of supervision, where they are willing to undertake eradication work.

This policy is also being followed in the pine region outside Litchfield County, although it is quite possible that if any serious infections are discovered in that region, intensive work on a cooperative basis may have to be undertaken as in Litchfield County, but conditions do not at present indicate it.

White pine constitutes about 25% of the lumber used by Connecticut industries and 80% of the supply is grown outside of the state. Under these circumstances, there can be little question that the growing of white pine as a crop should be encouraged, or some other species grown to take its place. For some purposes, such as box boards, other species may, of course, be substituted, but since white pine will always be preferred for many uses, there is every reason why its growth should be encouraged.

Until control of the blister rust is demonstrated to be effectively established in Litchfield County, the planting of white pine in that region, or in other regions where natural reproduction is assured, will not be recommended, but instead the planting of red pine or some other conifer will be favored to supplement the natural pine stands. Outside the pine region, however, the chances for growing white pine under "rust-proof" conditions are good. The blister rust hazard appears to be no greater in southern Connecticut than the hazard presented by fire, weevil and other insect pests. Planting white pine in mixture with red pine or some other species will therefore be recommended wherever "rust-proof" conditions can be established and maintained.

In conclusion I would sum up the Connecticut situation as follows:--

1. The State needs white pine in its industries and should do everything possible to encourage its growth as a permanent timber crop.

2. There are no sections where control of blister rust as yet appears impracticable or inexpedient.

3. Our main problem is how to educate the pine owner to eradicate ribes before his pine becomes diseased.

4. Community cooperation is preferable in the pine-ribes region, and perhaps throughout the pine region, but individual cooperation seems entirely practical throughout the rest of the state.

5. After the first complete eradication of a region, the maintenance of control should doubtless be left with the owners, but follow-up work will be necessary under state supervision and with frequent inspection by state men.

Use of White Pine in New York State

by

C. R. Pettis, Superintendent of State Forests

New York perhaps may be in a somewhat different situation than some other states on account of the extensive area and diversified conditions. In different and separate sections of the State, the fruit industry is of very great importance. The currant and gooseberry in some sections is of far greater economical importance locally than is white pine.

The Conservation Law gives the Conservation Commission the authority to investigate and determine and set aside fruiting currant district areas in which the current fruit industry can be developed and the growing of white pine is prohibited, and similarly the law provides that in sections where white pine is of paramount importance that the propogating and growing of currants and gooseberries can be prohibited. This plan has been carried out in this State, and has produced a practical solution of some of the questions which arise in connection with handling the blister rust control work.

There is an enormous area along the north half of the State, extending generally from Glens Falls to the Canadian line, which is more or less of a sand plain, and in which white pine is the predominating tree, and in this area the white pine forest will, over nearly all of this strip, reproduce and establish itself without any planting. This leaves but one problem open to be handled in order to influence the proper forest productivity of this land, outside of forest fire, and that is, the eradication of the currants and gooseberries, in order to prevent infection of the present and new stands of pine.

It may be said generally that reforesting will cost about $8.00 per acre on the average. In this area eradication can be accomplished at prices varying from $1.00 to $3.00 per acre. In other words, we can establish and maintain white pine forests over this vast area, or over more than half a million acres, for about 1/4 to 1/3 of the cost of making a plantation, by conducting proper eradication methods. It is within this area that our efforts within the past several years have been mainly put forth.

At the present rate of eradication and the rapid rate of infection, it is necessary that more rapid progress be made in eradication, or otherwise a very large area will be infected and killed before it can be placed under proper protection.

We are putting forth strenuous efforts to reforest vast areas of land throughout the State, inasmuch as we have about four million acres of land that is unsuited for anything else except growing of forest trees. A large part of this is now idle. This area is, as a rule, covered with but a small quantity of currants and gooseberries and can be eradicated cheaply. We are not hesitating to recommend to private owners the reforestation of these lands, provided they eradicate the ribes.

White Pine, on account of its characteristics and adaptation to our conditions is an absolute necessity in the forest program of New York State.

In many cases, the expense of eradication can be greatly reduced by the substitution of red pine, - to plant red pine in an immune zone between the sand areas which are to be planted with white pine, and areas, where the expense of eradication of ribes would be too expensive. The great trouble with red pine is the difficulty of obtaining seed in sufficient quantities.

We are now planning an inspection of a great many plantations by foresters during the coming summer to ascertain if the purchasers of trees have complied with the agreement to eradicate the ribes, what success they have had in planting and to obtain data in regard to the growth of these plantations.

We also plan to continue the general scouting work through the State and get more detailed information in regard to blister rust conditions in plantations and annual growth outside of the big white pine belt above referred to.

Supplemental Details of New York Blister Rust Program

by

A. F. Amadon, State Leader.

As a large part of the white pine district lies east of the state forest preserve it is a question of getting the work done on private land by the land owners. This can be done, we believe, by means of the educational agents. They should be increased in numbers this next year if appropriations will permit. We believe a large area was cleaned up late in the past eradication season, by the agents that we had on. We can safely say, that the work will each year become more and more accelerated, and greatly increased yearly acreages will be eradicated.

The future program should work for a continued and increased amount of work along the present educational program of agents. That white pine on state land, will be protected by state crews. Every effort will be made to rapidly and systematically increase the acreage eradicated by owners,

so as to secure as much acreage protected as possible in the least amount of time to offset the increasing amount of pine infection and consequent loss from the rust. An efficient checking system will be maintained on state and private land. The state will provide properly trained foremen to assist white pine owners in order to guarantee the effective removal of the bushes.

A system of rust and Ribes cruising will be worked out for determining when and where Ribes should be re-eradicated on areas worked in former years. The State will re-stock state owned plantations after they have been protected and where the re-stocking will not naturally be taken care of by native reproduction. Re-stocking under similar circumstances will be recommended to private owners.

The Blister Rust Situation in Michigan

by

L. R. Taft, State Horticulturist

We feel we have been very fortunate in escaping from any very serious inroads from the white pine Blister Rust, especially as it has been very troublesome in the states to the west as well as to the east. The only white pines which have been found infected were in two nurseries which received lining-out trees from Europe some 12 to 15 years ago. The blister rust was noted upon a few trees in each shipment after they had been planted three or four years and all of the trees in both shipments still in the nurseries were destroyed. Since that time, five infected trees which had been sold from one of these nurseries, had been

located but so far as known, none of the trees sent out by the other nursery were infected. Although a careful watch was kept of the currants and gooseberries, both native and cultivated, in the county where these nurseries were located and where all of the white pines sold from these shipments were planted, until this year, no infected ribes were found.

Mr. Baxter, who spent several months in Michigan during the summer, scouting for the white pine blister rust, located a white pine which had come from the nursery mentioned above, on a private place some three miles south of the city of Pontiac and it was then found that practically every currant and gooseberry plant on this and three or four adjoining places, had become infected. The attention of the owners was called to the matter and they very willingly ordered the destruction of all wild ribes and of several plants of cultivated black currants.

Some two miles away and towards the southwest, a direction against the prevailing winds, the disease was found also on a black currant plantation. So far as is known, there were no infected white pines nearer than the one referred to above. In fact, the number of white pines in that section is very small indeed, except upon two or three places well outside of the infected region where extensive plantings have been made.

It is to be hoped that no ribes plants have become infected near enough to these plantations so that the disease could spread to them.

Under the Michigan law, we have authority to require the destruction of all trees or bushes infected with this disease and thus far have had the best of cooperation from all of the owners where the disease has been found. Each year a very careful watch has been kept of all of the nurseries and many of the white pine plantations and the native pine growth have been inspected, especially along the St. Clair river between

Michigan and Ontario and along the borders of the state adjoining Wisconsin. We consider it highly important that this scouting be kept up in the future.

Since there are very few white pine trees within the area where infected ribes plants have been found, it is possible that the disease has been quite thoroughly cleaned up at Bloomfield Center near Pontiac, but owing to the extent to which the disease had been spread upon Ribes, and its proximity to the white pine plantations referred to above, we believe that several of the townships in that section should be very thoroughly scouted next year.

While it is possible to do something in a general way to locate outbreaks of a disease, except as it may be spread from the outbreak in Bloomfield township and may come in from Ontario and Wisconsin, we can see no reason where there is any more danger of the appearance of the disease in one section of the state than in every other section, and of course a general scouting of the entire state is out of the question, especially as there are very few white pine plantations except in the upper half of the Lower Peninsula and in a few sections in the Upper Peninsula of Michigan. In addition to plantings done by the State and Federal Governments and by a large number of private owners, there are many thousands of acres of cutover land in Michigan where there is a new growth of white pines which have developed from seed trees left by the fires and which already have a considerable value, and if protected from fires and disease, will make valuable timber when they have matured.

There are comparatively few commercial plantations of ribes and very few white pines, native or transplanted, and we have hopes that with a little effort in the way of destroying the infected ribes, the disease may be kept

out of the sections of the state where white pine forests are likely to have commercial value.

Cooperative White Pine Blister Rust Work Policy and Projects for 1923 in Minnesota

by

W. T. Cox, State Forester.

Conclusions drawn from educational work in 1922.

1. That it is unprofitable at the present time to continue educational work in northern Minnesota north of the latitude of Duluth, except in the manner incorporated in this statement of policy.

   (a) Because of large amount of land owned by non residents. Over 82% of the land is vacant.

   (b) Because most settlers would rather destroy a tree than save it. Someone must first sell forestry to these people.

   (c) Because only a small proportion of the white pine reproduction in Minnesota on <u>occupied</u> land lies within this northern territory.

Policy for 1923.

1. That the intensive educational work be limited to counties where white pine is known to exist in reasonable amounts. This area comprises approximately the St. Croix watershed as outlined on the accompanying map, and is larger in area than the state of Connecticut. A large percent of the white pine in this area is on non agricultural land.

2. That the work outside of this territory be limited to county fair exhibits, general publicity, lectures and special projects such as one now pending - namely, the giving of expert advice on white pine planting in cooperation with the N. E. Experiment Farm in St. Louis county.

Projects for 1923

1. Intensive educational work in the restricted area of seven counties, including the gathering of the following specific data for each woodland area.
   (a) Acreage, age, percent stocked, species and percentage in mixture, percent of non-agricultural land and why, volume of timber, and also the data required for Form BRE-R.
2. Lectures to groups of interested farmers.
3. County fair exhibits to which one man should devote his entire time from August 1 to October 1.
4. Scouting during the late summer in conjunction with the educational work.
5. Special projects such as outlined in St. Louis county.
6. Projects for winter only, to include:
   (a) Compiling data obtained thru field work.
   (b) Preparation of exhibits for county fairs.
   (c) Preparation and publication of articles and photographs of interest to pine owners.

Conditions and Policy as Regards White Pine Blister Rust in Wisconsin

by

H. J. Nirman, State Leader

The conditions in Wisconsin are decidedly different from those which prevail in the New England states and New York. As far as topography is concerned, nearly all of the land is suitable for agricultural purposes, excepting the steep banks along some of the rivers. There are some extensive areas which are too sandy for good farming at the prevalent prices of crops and under present labor conditions, but it is difficult to say at what time even the greater part of such soil can be cultivated at a profit. Generally speaking, the surface in all parts of the state is level or rolling, and rainfall is sufficient to support the ordinary farm crops.

On account of the favorable conditions for agriculture, combined with the demand for the best grades of timber, most of the state consists of cleared land with tracts of timber intervening. The white pine areas are usually small and scattered. Frequently such stands twenty, or even thirty miles apart, with an occasional group of a few trees, either among hardwood or as ornamentals about dooryards, remaining. Frequently large stumps in woods and pastures indicate that white pine were formerly abundant.

In such localities the ornamental white pine groups are highly prized. It is not at all unusual for a farmer to say that he would not lose his ten or twelve white pine trees about the dooryard for $500. The forest pine, too, is usually highly regarded, as the farmer desires to keep the timber as a reserve for building purposes.

Unfortunately the Wisconsin farmer does not consider the small

white pine trees as of much consequence. Apparently he does not fully realize that a small tree is as necessary to the future woodlot as the small corn plant is to the corn crop. The average farmer seems to think that his dairy cows need every corner of the farm in order to produce milk. I am strongly of the opinion that livestock is almost as serious a factor in the destruction of small white pine as fire. The same holds true for other kinds of timber.

From the beginning it was fully realized by the state authorities that the blister rust is a serious disease, and efforts were made to control it without delay. The primary objects were, and still are: 1st, to save the forest white pine; 2nd, to save the ornamental pine; and 3d, to protect the neighboring states, chiefly Michigan and Minnesota. The forest white pine large enough for saw logs is considered to be worth about $15,000,000, however, the real value is probably much greater because there is a considerable amount of scattered pine in farm woodlots which is not included in the estimation.

Although many farmers maintain a woodlot containing pine suitable for pulp wood and box timber, such timber is far short of what might be desired. However, there is a real shortage of small white pine. Contrary to the usual opinion, reproduction is good where seedlings remain undisturbed, but on account of intensive pasturing the farm woodlot usually contains but few seedlings and the saplings are as a rule badly injured, and few in number. In the northern counties fires have destroyed vast areas of pine and hardwood reproduction, and in many localities formerly covered by white pine there is scarcely a sapling of this species remaining. In other sections moderate reproduction is taking place.

Early in the control work it became evident that if the ornamental

white pine should be destroyed by the blister rust, the state authorities would be seriously criticized because of negligence. It would take a hundred years to replace the present ornamental pine and would cost tens of thousands, if not hundreds of thousands, of dollars in expenditure for nursery stock to give the homes their present appearance.

The Blister Rust Control Problem in the West

by

S. B. Detwiler, Office of Blister Rust Control,
United States Department of Agriculture

In cooperation with the Northwestern States and the Dominion of Canada, the Bureau of Plant Industry has completed a thorough investigation of the extent of the blister rust outbreak in the West. The evidence at hand shows that blister rust has been present 12 years; that its present range is north (on pines and Ribes) to the limits of white pine, east (on pines and Ribes) to Beaton, B. C., and south (on Ribes) to the Columbia River, thus occurring within a triangle of country roughly 300 miles on a side.

The disease is established in British Columbia and western Washington beyond hope of eradication. Preliminary experiments indicate that practicable methods of local control of the disease may be developed in a considerable portion of the western white pine area where this tree is of greatest commercial value. The exact cost of local protection and the extent to which such methods can be applied remain to be determined.

Eradication of Ribes was conducted in northern Idaho on 414 acres in eight areas representing different forest types. Wild Ribes are absent or

nearly so over large areas, and very numerous in restricted areas. Up to 700 bushes per acre, having more than 10,000 lineal feet of live main stems, were removed from certain blocks. In other blocks of large size no Ribes were found. In general, this year's work shows that the cost of blister rust protection on large tracts of western white pine in Idaho will approximate an annual charge of 3 cents to 12 cents per M feet of merchantable white pine in mature stands. The annual charge in young growth will vary from 3 cents to one dollar per acre and probably will average less than 25 cents per acre per year. This statement is based on an estimated cost of crew work along streams at $10 per acre and $4.50 per acre for crew work on upland types. The cost of scouting should not exceed 8 cents to 20 cents per acre. The proportion of land that can be worked by scouting will determine average cost. It is assumed that the land will have to be gone over regularly at five year intervals, and it is also assumed that fewer currants will be found and the work will cost less after the first time over an area.

The blister rust has shown unprecendented severity of damage to large growth in western white pine areas in British Columbia. Western white pine is even more susceptible to this disease than the eastern white pine, and conditions in the West favor an epidemic of great destructive force.

The western white pine of the Inland Empire and the sugar pine of California are by far the most valuable timber trees in the regions where they grow. The present merchantable stand of western white pine and sugar pine is estimated at slightly more than 57 billion board feet, valued at approximately $228,400,000. This timber, which is constantly increasing in value as eastern supplies are exhausted, is nearly three times the remaining

stand of eastern white pine. Colonel W. B. Greeley states the situation thus:

> "In addition to its general interest in the preservation of a natural resource of this magnitude, the Federal Government is directly interested, through its ownership of some 20 billion board feet of standing timber and large areas of young growth of the two species concerned. Even more important from the standpoint of the blister rust than the stands of mature timber are the large areas of second growth, which are particularly liable to damage. In addition to the 8 million acres of old growth timber there are from 12 to 13 million acres bearing young growth in which western white pine or sugar pine should form permanently an important part of the stand. The present annual growth of the two species is estimated at about 250 million board feet and under continued management this could easily be doubled, since both species are well adapted for forest management. They therefore constitute an asset of the greatest value to the entire country which would be destroyed by the general establishment of the blister rust throughout this region. The Government is also keenly interested in preventing the infection of the other five-leaved pines in the Western States, namely, limber pine, white bark pine, foxtail pine, and bristlecone pine which, while of comparatively little commercial value, grow at the higher altitudes and are of considerable importance from the standpoint of watershed protection."

It is essential to public welfare that the blister rust situation in the West be met adequately by the Federal Government in cooperation with the States before it is too late to take the necessary steps to reduce losses to the economic minimum. The program which has been worked out in conference with representatives of the various State and other interests involved, is as follows:

1. Rigid enforcement of quarantines to prevent introduction of the disease at points where it is not yet present.

2. Abandonment in the western States of the growing of cultivated black currants, the most susceptible host plant of this disease, and one of the most active agents concerned in its spread.

3. Experiments in the regions where white pine is of greatest present and future importance, to determine the most economical methods of applying local control.

4. Investigation of the scientific facts of this disease in the West, its rate of progress and damage, susceptibility of host plants, and discovery of natural factors which may be used to retard spread or to increase effectiveness of control work.

5. Educational and demonstrational work to secure the adoption of the best methods of controlling the disease as rapidly as they become available, through cooperation with State, private and other agencies responsible for the protection and management of western forests.

The work proposed contemplates delaying the progress of the disease, the protection of uninfected areas as long as this can be done at reasonable cost, and the establishment of the best methods of local control for commercially important infected areas. The production of white pine in the West can be expected to continue only in the regions where local control measures are applied. Because of its immense holdings, the Federal Government is deeply and directly interested in dealing promptly and adequately with this problem.

The Federal Blister Rust Control Program in the East.

by

J. F. Martin, Office of Blister Rust Control,
United States Department of Agriculture

Blister rust control work has passed through two stages of development and has now entered upon the third. From 1898, when the disease probably first reached this country, to 1916 when it was found wide spread in the Eastern white pine region, was the period of restrictive measures aimed to check its spread. From 1917 to 1921 was the period of detailed investigation and experimentation, which resulted in the development of

successful local control measures. The third period of development namely, that of applying local control measures in a manner that will insure the perpetuation of white pine as a crop, began in 1922. The experience of the past year gives assurance that this will be accomplished.

Our present program calls for an intensive campaign of education and demonstration in white pine regions that will bring to each pine owner through personal contact the information and instruction he needs to effectively protect his pine crop. The object of this work is to accomplish the control of the disease by securing the general application of control measures by pine owners within a limited period of time. This is necessary to prevent severe losses to pine owners and to maintain the continued production of this valuable crop. The campaign is conducted in cooperation with the State agencies having charge of blister rust control work and the State Agricultural Extension Divisions. The cooperating State agency assists pine owners to do control work effectively and economically and where necessary enforces the State blister rust laws, while the State Extension Division is of material aid to blister rust agents in reaching and instructing pine owners and in furnishing headquarters for their activities.

In undertaking this program it was estimated that from 5 to 8 years would be required to complete the work. States with small amounts of white pine will require less time, probably from 3 to 5 years. Table I shows for each State the progress which has been made in Ribes eradication.

Section A of this table shows that Rhode Island and Vermont are the only States which have eradicated Ribes on over one third of their estimated acreage of white pine growth. In New England Ribes have been de-

Table I Ribes Eradication Progress

States	Section A			Section B				
	Estimated Acreage White pine growth	Acreage Eradicated 1917 -1922	Percent Eradicated	Acreage Eradicated 1917 -1921	Un-Eradicated acreage at end of 1921	Acreage Eradicated 1922	Percent of Un-eradicated acreage eradicated 1922	No. of times 1922 acreage must be multiplied each year to complete eradication program in 8 years.
Maine	3,000,000	375,959	12.5	185,750	3,814,250	190,209	6.7	1.72
New Hampshire	2,500,000	766,990	30.6	594,716	1,905,284	172,274	9.0	1.18
Vermont	86,000	37,490	43.5	23,978	52,022	13,512	25.9	0.35
Massachusetts	775,000	229,582	29.6	167,940	607,060	61,642	10.1	1.10
Rhode Island	125,000	122,997	98.3	111,497	13,503	11,500	80.5	0.02
Connecticut	190,000	25,045	13.1	17,170	172,830	7,875	4.5	2.61
New England	6,676,000	1,558,063	23.3	1,101,051	5,574,949	457,012	8.1	1.39
New York	1,500,000	209,444	13.2	198,414	1,301,586	11,030	0.84	14.62
New England & New York	8,176,000	1,767,507	21.6	1,299,465	6,876,535	468,042	6.8	1.71
Wisconsin	800,000	25,205	3.1	20,435	779,565	4,770	0.61	20.30
Minnesota	5,500,000	5,942	0.1	5,876	5,494,124	75	0.0013	9156.74
Lake States	6,300,000	31,147	0.5	26,303	6,273,697	4,845	0.077	161.73
Total all States	14,476,000	1,798,654	12.4	1,325,767	13,150,233	472,887	3.5	3.35

stroyed on 23.3% of the white pine acreage and in New England and New York combined, on 21.6%. In other words Ribes have been destroyed on about 1/5 of the white pine acreage in the northeastern States in the past six years. At this rate it will take 24 years to remove the Ribes from the remaining pine acreage in this region. In the Lake States less than 1% of the estimated white pine acreage has been eradicated, but these figures are less significant because field conditions differ greatly from those in the northeastern States.

Section B compares the un-eradicated acreage remaining in each State at the end of 1921, with the acreage that was eradicated in 1922. It shows that Ribes were eradicated in New England in 1922 on 8% of the remaining unprotected acreage. In New York and New England together Ribes were destroyed on 6.8% and in the northeastern and Lake States combined on 3.5% of the un-eradicated acreage. In order to complete our program in 8 years, New England will have to complete 1.4 times its 1922 acreage each year. If New York and New England are taken together, a yearly acreage equivalent to 1.7 times the 1922 acreage will have to be eradicated, while the Northeastern and Lake States combined must complete each year nearly 3½ times last season's acreage. This means that each State must speed up the work in the proportion indicated in the table, if the non-eradicated pine acreage is to be protected in 8 years.

Another factor which should add incentive to our efforts is the constantly increasing amount of pine infection in unprotected areas. A recent examination of pine on 12 miles of rod wide strip line in New York state showed 20% of the trees infected. An intensive study of a plantation in the same State showed over 24% or approximately 1/4 of the trees already diseased. This means that the pine on large areas will be destroyed before

it can be protected unless the present rate of Ribes eradication is greatly increased to offset the increasing amount of pine infection.

Although the present blister rust program has been under way less than 9 months, the question is frequently asked: "Do the results obtained under your plan of cooperative control work justify the expenditure of public funds?"

In Table II it will be seen that the acreage eradicated of Ribes in 1922 compares very favorably with the average for the five years ending in 1921. There are decreases in some States, but taken as a whole New England increased its eradicated acreage 107.4%, New England and New York together 80% and all States combined 78.3% over the average for the five years ending in 1921. A comparison of the estimated cost of Ribes eradication for 1922 with the average for the three years 1919 to 1921 shows a decrease of about $10,000 over the average. Expressed in another way, this table shows that while the acreage eradicated of Ribes under the new plan of work was materially increased over the average for the previous 5 year period, the cost has not increased above the average, but has apparently decreased.

Table II Comparison of 1922 acreage and cost of Ribes eradication with averages for previous years.

States	Average Acreage Eradicated 1917-1921	Acreage Eradicated 1922	Percent of increase over average acreage eradicated	Average cost Ribes eradication 1919-1921	Cost of Ribes Eradication 1922
Maine	37,150	190,209	412.0	$ 4,843	$ 8,012
New Hampshire	118,943	172,274	44.8	30,242	25,152
Vermont	4,795	13,512	181.7	3,023	6,031
Massachusetts	33,548	61,642	83.7	9,623	11,075
Rhode Island	22,299	11,500	-48.4	4.411	2,098
Connecticut	3,434	7,875	129.3	2,321	3,914
New England	220,269	457,012	107.4	54,463	56,282
New York	39,682	11,030	-72.2	42,221	34,083
New England & New York	259,951	468,042	80.0	96,684	90,365
Wisconsin	4,087	4,770	16.7	3,653	3,286
Minnesota	1,173	75	-93.6	3,718	25
Lake States	5,260	4,845	-7.8	7,371	3,311
Total all States	265,211	472,887	78.3	$104,055	$93,676

- Indicates decrease.

If we compare the acreage eradicated in 1922 with that of 1921 it is found that Maine, Vermont, New Hampshire, Massachusetts and New York combined have increased their 1921 acreage by 86,666 acres. Looking at the results of the work from another angle we see further indications of its success. Tentative reports on the amount of local cooperation with towns, associations and individuals show an increase from $19,013 in 1921 to $45,700 in 1922 or 140 percent. Such facts as these speak for themselves. However, the work has only just begun. We are developing a better organization, making more definite and more complete plans throughout and with efficient leadership our new plan of work will be successful beyond any present conception. Each State can help by immediately taking account of stock and preparing a blister rust policy with a definite objective and a practical program of work along the following lines:

1. Complete a pine and Ribes survey in 3 years as a basis for systematically securing the application of control measures.
2. Determine the acreage that must be eradicated each year to complete the protection of the pine growth within the next 8 years.
3. Formulate a detailed plan of work for each district or county that the blister rust agent can carry out this year and a broader plan for the 8 year period.
4. In addition to a plan, give each agent a goal toward which to work, such as a definite number of pine owners to instruct each year and a stated acreage of pine growth to be protected.
5. Analyze and summarize available state white pine and blister rust data for the immediate use and benefit of field men.
6. Employ one or more state men to check the efficiency of field work.

The Office of Blister Rust Control will help by:

1. Continuing experimental work to perfect and improve methods of Ribes eradication and collect data on damage, rate of infection, etc. for the benefit of the States.
2. Cooperate with the States in studying early demonstration areas to secure data on Ribes re-eradication and the effectiveness of control.
3. Giving the State leaders more assistance by supplying more accurate and abundant facts and material that will be useful in the educational campaign.
4. Supplying additional instruction to enable blister rust agents to increase their knowledge, broaden their view point, perfect their local plans and systematize their work so that they can conduct it more effectively.

5. Giving the fullest Federal support to the States in carrying out their formulated plans of work.

Each man should realize his opportunity to render real public service in securing blister rust protection, maintaining the productivity of white pine and assuring the future of this crop. With everyone striving for results along definite lines we are bound to succeed.

Federal Policy in Blister Rust Control

by

E. C. Filler, Office Blister Rust Control,
United States Department of Agriculture.

Forest protection, of which blister rust control is a part, is at present the important feature in the development of a National scheme of forestry. Forest fire control is the essential feature of the National policy, since this scourge destroys the entire forest. Blister rust uncontrolled will destroy only part of the forest, and other species of less value will then replace the five needled pines. The National policy relating to blister rust control must therefore be based on determination of the value of white pine in forest management under the increased cost and difficulties of producing it under Ribes-free conditions.

Demand and prices determine how much of any crop is produced. The acreage of land adapted to the growth of white pine is very large and the demand for white pine lumber is steady and practically unlimited. Stumpage prices of white pine have now reached the point where it is highly profitable to use low priced land for growing white pine. The average increase in stumpage values in New England during the past ten years has been about

50¢ per year per thousand feet. A well stocked pine lot in New England today pays from 4 to 10 percent compound interest on the investment over periods of 35 to 70 years. Other species give equal or greater returns than white pine in restricted areas, but over a large part of our present non-productive land from Minnesota to Maine, white pine is the best species for reforestation purposes.

The present timber shortage will be relieved only through an aroused public interest in forest regrowth, and in white pine, we find the tree best adapted to stimulate such interest. The policy of the Federal Government is to extend knowledge of protective measures and methods of management of white pine and other forest crops. White pine will continue to be recommended as the species to be favored wherever it is the best tree for the purpose, due regard being given to Ribes conditions. Professor Russell Watson of the University of Michigan has recently said:

> "We need timber as badly as we need cotton; and a tip weevil, which is abundant or blister rust which is everywhere, should not cause us to abandon forestry - it should simply spur us to greater efforts."

Methods of controlling the blister rust in the Eastern United States are now so well worked out, and the cost of this protection is so small in comparison with the financial returns, that white pine can successfully compete with other species adapted to the same site. The National policy is to encourage the eradication of Ribes, and other necessary protective measures to increase the regrowth of white pine throughout the Eastern pine regions. This statement applies also to the planting of white pine, emphasis being laid on the importance of eradicating Ribes before planting and care in selecting planting sites comparatively free from Ribes. Community cooperation in Ribes eradication and the growing of pine in pure stands and large blocks is encouraged as a means for the most effective protection from blister

rust at least cost.

It remains to be determined whether blister rust control will be effective and economically feasible in the Western white pine and sugar pine regions. These species now have a higher stumpage value than any other species in the West, and are as important to the development of forestry in the regions in which they grow as the Eastern white pine is in its range. Determined effort will be made to develop control methods adapted to Western forest conditions.

The function of the Federal Government in blister rust control work is to assist the states by acting as a clearing house for facts relating to pine growth and protection. In cooperation with the states, definite standardized practices have been developed in fire protection and blister rust control, and federal financial aid given in such work. Federal experimental work is being carried on to determine the best ways of managing, protecting, renewing and marketing the white pine crop, and the knowledge gained given to the states and pine owners. The Federal forest experiment stations to be established in New England and the Lake States will be of great importance in this work. The results of investigations on the life history of the blister rust fungus, and experiments to further perfect methods of control are made available as rapidly as possible. In order that proper planting sites may be selected and white pine maintained and extended as a crop, land classification and a pine-Ribes survey should be made in cooperation with the States.

Three agencies in the United States Department of Agriculture are cooperating in the extension of blister rust control. These are the Forest Service, the States Relations Service and the Bureau of Plant Industry. The cooperating State and Federal forces have the opportunity to be of public

service in securing better managed forests and increased timber growth. It is not the policy for blister rust workers to go outside their field except as the cooperating agencies agree it is desirable. These agencies should prepare a questionnaire giving the blister rust agents information on the management of white pine and allied subjects on which the public expects them to be reliably informed. The State and Federal agencies concerned should go further. At the conference of foresters and extension workers to be held in New Haven this month, recommendations should be made concerning how and to what extent the county blister rust agent should aid in bringing about a better understanding of forestry.

No better avenue can be found to teach the principles of forestry to the average man than through information on actual examples of white pine yield and return. Such examples are legion and will be as useful in encouraging better care of the forests in the Lake States, in the South and the Far West as in the Northeastern States. In the Northeastern pine regions, the white pine woodlot is the farmer's savings bank. He maintains the pine lot without being any poorer than he would be without it. In fact, the total number of days of productive man and team labor on the farm is increased through winter work in thinning the woodlot. When sudden need arises, or the time comes to retire from farming, the pine owner calls in the timber buyer and collects his savings account. A well cared for woodlot of any commercial species is a valuable farm asset. Few other American trees have wood of the value and good qualities of white pine, and no other in at least part of its range. Likewise, for much of its range, no other tree of equal value is managed so easily, grows so rapidly or can be cut with profit at such an early age.

The agencies cooperating in blister rust control want to build up

forest production, including the production of white pine where that is the best crop. Preaching blister rust control is a means to that end. The approach must be fundamentally through selling the idea of white pine as a crop, with continued, systematic Ribes eradication as part of the job of growing the crop. Sell a man the idea of white pine as a crop and you likewise sell him a permanent interest in effective blister rust control or any other measure required to insure and increase the value of the crop.

Professor Toumey of the Yale Forest School states in "The Governments Relation to Forest Resources": "Our policy of cooperation between the public and the private owner of forest property is at its beginning, but it holds, in my judgment, the most practicable means for attaining adequate fire protection and regrowth on four-fifths of our entire forest possessions. *** Under the existing laws in many states, the Nation the State and the town cooperate and share expenses of fire protection and fire prevention on privately owned forests. There is no inherent reason why the same policy cannot be extended through the application of approved methods for attaining acceptable regrowth."

In the annual report of the Forester for 1922, Colonel Greeley states one of the immediate needs in the national forestry policy is the extension of Federal cooperation with the States in forest protection on a scale commensurate with the national interests at stake and adapted to the practical requirements of the situation.

The Federal blister rust program must be finished within the next eight years. In that time we must accomplish Ribes eradication where needed, and beyond that, a regard for the white pine crop that will insure recurrent Ribes eradication as needed. We can carry out our program if we look ahead, map our course on facts and put the strength of true cooperation into this new work that we put into our work as previously organized.

Blister Rust in Canada

by

Dr. A. W. McCallum, Pathologist,
Division of Botany, Ottawa.

During the season of 1922 our knowledge of the distribution of blister rust in eastern Canada was considerably extended. Previously this disease had been known to be present only in Ontario and Quebec but we now have records of its occurrence in Prince Edward Island, Nova Scotia and New Brunswick. That is to say, blister rust is now present in every province in which eastern white pine is found with the exception of Manitoba, where the amount of pine is negligible. In Prince Edward Island which is a small province almost entirely devoted to agriculture blister rust was found at the capital, Charlottetown, on black currants. As the amount of white pine occurring in the province is of no importance from a commercial point of view, the only damage which could result there from the rust would be to pines planted for ornamental purposes. In Nova Scotia rust was found late in season of 1921 at one point, and last year further scouting showed it to be present in 8 widely separated localities, in each case upon black currants. In this province it is estimated that there is about half a billion feet of mature white pine left. The greater part of this timber is located in the south-western portion of the province where rust has not yet been found.In New Brunswick blister rust was discovered on black currants in one locality in Westmoreland County which is in the south-eastern part of the province. New Brunswick contains about the same amount of white pine as Nova Scotia.

In Quebec unfortunately our knowledge of the distribution of rust is not as exact as might be desired. We are aware in a general way that

the disease is more or less prevalent throughout that portion of the province lying south of the St. Lawrence and west of Quebec city. Also it is found on the north shore from Quebec to Montreal and on farther west probably as far as the country opposite Ottawa. Quebec is supposed to contain much more white pine than any other province, the amount being estimated at about 35 billion feet.

In Ontario blister rust is generally distributed throughout the southern part of the province north to a line joining the Muskoka District with Renfrew County. In the latter region especially there are valuable stands of young white pine averaging about 25 years of age. Blister Rust has been present here for at least four years but as yet the pine stage of the disease has not been found. In the southern part of Ontario the land is mainly devoted to agriculture and it may be said that there are now practically no commercial stands of white pine though the aggregate amount as contained in farmers' wood lots is probably considerable. In addition, the province is adopting a progressive policy of planting up waste lands and in this work white pine is being used to some extent. In Ontario it is estimated that there are about 8 billion feet of pine.

This gives a total of 44 billion feet of pine in Eastern Canada. In 1919 it was estimated that we had 60 billion feet and even the present estimate is probably much too high because the figure for Quebec has not been checked up in any way as yet. Before a survey of the forest resources of Ontario was made, it was thought that that province contained about 20 billion feet of pine. As a result of the survey this figure has been reduced to 8 billion and it is quite possible that the figure for Quebec will be reduced proportionately when a survey of the resources of that province has

been made. These figures have been supplied by the Dominion Forest Service.

In certain localities in eastern Canada there are also good stands of pine reproduction and second growth which is not yet merchantable but in general this tree is not reproducing as it should. In my opinion this is mainly due to present methods of logging. While at one time our forests were undoubtedly composed chiefly of white pine the selective system of logging under which only the most valuable species and the best individuals of those species are removed has worked to prevent these species from reproducing to any extent. Such seed trees as are left are either of less valuable species or are individuals of the more valuable species which are unmerchantable because of decay, poor form, suppression or immaturity. Thus, areas which were once chiefly covered with white pine and spruce, have come to contain only spruce and balsam, then only balsam, birch and poplar and finally birch, poplar and other inferior species. In passing it may be noted that such reproduction as does result from the unhealthy seed trees of the valuable conifers may reasonably be expected to be more susceptible to diseases of all kinds than reproduction which has arisen as the result of seeding by healthy, mature seed trees and, further, the presence of diseased trees, snags and slash ensures that the new growth will be thoroughly exposed to infection. The result of this is that over large areas of eastern Canada which have been logged once, white pine does not appear in the reproduction to any extent and in the future, as indeed at present, we shall be mainly dependent upon spruce for our supplies of timber. In addition to the fact that pine is not reproducing on cut over lands we have the further, unfortunate feature of having pine and all other valuable species disappear, through the effects of repeated fires, from areas which once supported valuable stands of pine. Here in New England your forest

conditions are fortunately not the same and over large areas there are valuable stands of pine reproduction and second growth which are well worth protecting.

The feature which is of greatest moment as far as eastern Canada is concerned is the comparative abundance of the currant stage of the blister rust and the scarcity of the pine stage. In the Niagara Peninsula where blister rust has been present for from twelve to fifteen years and where there are large numbers of cultivated currants and gooseberries of all kinds, one would expect that conditions for the dissemination and development of rust would be very favourable. As a matter of fact, however, the results of a study continued over a period of four years show that an average of less than 2% of the pines found in farmers' wood lots are infected. In this connection, though, it should be borne in mind that the district is an agricultural one and the amount of white pine which occurs there is small so that these results are probably not indicative of what conditions might be in a district containing pine in commercial quantity.

As far as damage to white pine on a large scale is concerned, such as I have had the opportunity of seeing in this country, I do not think that this has yet occurred anywhere in eastern Canada. At this time I can only recall two cases where pine is affected to a considerable degree. One of these is near Fonthill in the Niagara Peninsula where in a small grove there are about 33% of the pines diseased. The other is at Pointe Platon on the south shore of the St. Lawrence near Quebec where in a plantation of 400 trees there are 67% infected. These trees were undoubtedly diseased when they were set out in 1908 and as the owner has maintained a patch of about 250 currants and gooseberries close by the conditions were ideal for the development of the rust.

I am unable to explain why it is that the percentage of infection of our pines is not greater than one would expect it to be in view of conditions in New York and in New England but the fact remains that this disease has not yet established itself to any extent in areas containing white pine in commercial quantities. It may be that it has not been present long enough in such areas to indicate what damage may result from its continued occurrence there or it may be that the prevailing conditions - especially as regards temperature and moisture - are not as favourable to its development as conditions elsewhere. The only feasible method of control of this disease and the proper application of this method being known - and for this latter great credit is due to the admirable services of this country which deals with such matters - there comes the question of whether or not we would be justified in recommending the necessary expenditure of money to carry out control measures. Personally, in view of the fact that we are not yet certain that under our forest conditions blister rust will prove to be a serious factor, I do not think that we would be. Further, we are at present in the unenviable position of having our national expenditure exceed our national income and the result is a demand for rigid economy in all departments of the public service. Whether such limited or curtailed expenditure in certain phases of work can properly be termed economy is very much open to question but that does not alter the essential facts of the situation. In view of this it is very doubtful if money could be secured for the control of a disease which has not yet proved serious under our conditions. Therefore, I believe our logical course is to continue to maintain a staff of men in the field each year who will keep a close check upon the progress of the rust and if at any time it should be found to be developing upon a large scale and infecting and killing trees to an econ-

omic extent then control measures could be applied. Since this rust is not known to spread from pine to pine the eradication of the alternate host at any time would prevent the further development of the fungus and confine the damage to those trees which have already become infected.

Blister Rust Control & Forestry

Summary of Address by John Willard,
Director of Extension, Massachusetts.
(From notes taken at the Conference.)

Extension work in its more profound aspects has two distinct problems:-

1. To remedy present ills.
2. Anticipate future development, and plan to remedy ills that then will develop, if not guarded against.

It is a fundamental part of extension work to foresee future developments.

The present focus of extension work is on the group, and the individual is reached through the group. Formerly, the individual was reached direct but group action is quicker and more effective in securing action by individuals. Also more attention is focused on the county centre, rather than on the extension specialists at the college as the centre of extension. We have also gotten away from stressing one or a few special projects because the particular agent was specialist, and now there is a balance of all the farm enterprises.

The time element is an important part of the project, i.e., fixing a schedule of accomplishment or time for completion. Definite lines and definite concepts are also laid down, and the project must be essential,

valuable and timely; must have popular interest and support.

There are three steps in getting project done (same in salesmanship, education or extension):

1. Secure interest and attention.
2. Lead to confidence and desire; secure sustained interest.
3. Secure action.

Forestry stands the test of the first requirement. It should take its place with other projects in the farm balance. It is one of the enterprises in which the farmer is interested and from which he gets part of his income. Forestry in farm management is less than agriculture. Exception may be made that forestry in national and state forests is equal to agriculture. Woodlot management, a part of forestry, is less than agriculture - it is similar to dairying and orcharding, a project of agriculture. White pine work is a part of woodlot work, and blister rust control work is a part of white pine work. In the state as a whole, white pine has a much larger opportunity than other types of forestry work, but there are sections in which white pine is secondary, but of importance. The blister rust is only a part of the pine problem, but it is the immediate, prime outstanding thing to be undertaken.

Forestry has popular support at the present time. More letters have been received at extension headquarters regarding it in the past six months than ever before. The slump in market conditions is part of the reason. The project is timely.

Blister rust interest will grow in proportion to forestry interest. If a larger forestry program is evolved, the demand for blister rust protection will grow in proportion.

Confidence is a matter of money - financial returns - achieved by focusing attention on returns 5, 10, 20, 50 years hence. Approach blister

rust protection from the angle of offering help in marketing, and thus increase interest in protection of a paying crop. (Reference was made here to recommendations on forestry contained in the ten year program of extension drawn up at the Governor's Conference., Jan. 1923).

Favorable response was given by Farm Bureau officials of three counties on extension in Massachusetts, with whom the forestry program was taken up recently. It is a feasible program for next five years even if no county forestry agent is gotten this year. Ultimately the outlook is for County forestry agents, and a college extension specialist in forestry, in same relation to the county forester that the agricultural extension specialist is to the county agricultural agent now, and with close cooperation with the State Forester. The time is ripe for the development of blister rust work into forestry.

(Report referred to by Director Willard).

All New England Conference

Jan. 16-19, 1923

Report of Committee on Forest Products.

It seems eminently fitting that forestry should be considered in any discussion of the land problems of New England because we have discovered after 300 years of experimentation that a large part of this region is better fitted to growing timber than any other crop. Moreover at least 1/3 of the average farm should be producing timber crops. It is impossible, however, to separate the farm woodlot problems from those of the larger areas of woodland. What concerns one, is of vital interest to the other. It is all one land problem. Each part of our heritage must be made to do

its full share or the other parts have to carry unfair burdens.

Nowhere is this interdependence more apparent than with tillage land and forest. The farmer must have wood for his buildings, his tools and his fuel. There is no equally profitable way, in the long run, in which he can employ the otherwise idle time of his men, his teams and himself than working in his woodlot. If his woodlot is not kept in productive condition he not only loses this chance for profitable work but his tillage land carries an undue burden, the community is impoverished, and he has to pay huge freight bills to have lumber brought from the Pacific Coast.

For we must definitely face the unwelcome fact that the last bit of our virgin timber is in the Pacific northwest. The southeast upon which we have been depending for the last 30 years for inside finish and other high grade lumber is now practically cut out. Our clear lumber must be hauled across the continent or come through the Panama Canal. This costs from $15 to $30 per M board feet. The price of lumber is determined by this charge plus the costs and profits of the Oregon and Washington lumbermen. This means that in the future the price of every piece of wood which enters into our homes, our manufacturing plants, our ships and our railroads will be determined not by the cost of producing it but by what the lumbermen of the northeast may think is a fair price. Massachusetts imports 80% of the lumber it uses while New England as a whole is not producing more than 1/2 of its needs even taking into consideration the immense forest area of Northern Vermont, New Hampshire and Maine.

Such a state of affairs is a menace to our prosperity. It is more than that. It is a challenge to action. With an unusually favorable

climate, and a ready market, New England can raise her own forest supplies whenever we think it worth while to do so. To accomplish this the following suggestions as to what should be done within the next 10 years are offered for your consideration. These are grouped under 2 main headings, those of great urgency and those which are not so pressing. Among the first are adequate protection from fire, from unjust taxation, from insects and fungi, the education of our rural leaders to an appreciation of woodlot problems, expansion of Federal, state and town forests, and most important of all the placing in each woodland county of a trained man who can do for the forest land what the county agent is doing for our tillage lands. Of somewhat less importance are an adequate inventory of our land resources and their possibilities, local committees to further forestry progress, better care for our shade trees, and the prevention of woodland trespass.

1. Adequate fire prevention is the cornerstone of timber crop production and the aim should be to so reduce the annual loss that commercial insurance at reasonable rates will be practicable. To this end the State Foresters are hereby requested to report at the next annual meeting of this conference on the methods and estimated cost of attaining this goal. It is suggested that the Commissioner on Conservation of Massachusetts act as Chairman and call upon the insurance companies for what assistance they can furnish.

2. No timber crop can be raised without tax justice. Taxing growing timber is as absurd as the taxing of corn each day of its growth. Some of the New England states, notably Massachusetts, have already taken steps toward correcting this injustice. We hereby request that a report summarizing progress and bringing out methods of improving existing condi-

tions be made by each State Forester, each State Grange, and each State Tax Commission at the next annual meeting of this Conference.

3. Certain insects and fungi notably the white pine blister rust, the browntail moth, the gypsy moth, the spruce budworm, the larch sawfly and the white pine weevil have proved very destructive to tree growth and must be combated over large areas to be kept in control. Most if not all can, however, be reduced to negligible proportions. Reports are therefore requested from the responsible officials in each state as to the cost of the most complete suppression of these and other similar dangerous pests.

4. The raising of woodlot crops has been profitable only for the past 25 years. This change in conditions has not yet brought about corresponding changes in the curricula of our agricultural colleges. The education of our county agents and other farm specialists has been almost wholly tillage landtraining. To correct this anachronism it is recommended that a joint committee of the New England section of the Society of American Foresters and the farm management specialists of New England draw up a statement to be presented next year, on the minimum requirements for teaching forestry in our agricultural colleges.

5. The White Mountain National Forest in addition to protecting the headwaters of the principal navigable and power streams in New England is also acting as a reserve source of supply to our woodusing industries. It is, therefore, urged that Congress continue the annual appropriations for the purchase of the 40% of additional land which should be included in this Forest.

6. State Forests are endorsed for much the same reason. They act as demonstrations of forestry methods, and as supply reservoirs for local

woodusing industries. These industries, if retained, will furnish a permanent market for farm products. Furthermore, the local labor conditions will be estabilized. A report is requested at the next annual meeting from each of the state foresters as to the percentage of forest area in his state which should be purchased for this purpose.

7. In addition to national and state forests there should also be more town forests. These need not be huge contiguous tracts but may consist of a number of parcels of any size. Besides serving the same functions as other publicly owned forests they may also be used for recreation purposes and the protection of local water supplies. In no other way can the possibilities of forest management be brought home to everyone so effectively, especially when these forests commence to yield returns which can be used to replace tax assessments. Some European towns make no tax levies but build and maintain improvements with their forest income. It is, therefore, recommended that each Governor in New England request town officials to insert in the warrants for the annual town meetings, an article authorizing the appointment of a committee to investigate the feasibility of a forest for each town.

8. As the county agents have more available for local use the latest information in regard to farm practices, so there is needed in each county a forester to promote better woodlot management. Little progress will be made in cooperative marketing of forest products and much of our idle cutover lands will continue to be a dead weight until there is someone in each county, thoroughly familiar with local conditions, whose business it is to help solve those very difficult problems. The cost of this work should be met in the same way as that of other county extension projects, the men appointed should be appointed by the state foresters and

should work in close cooperation with them. Each county farm bureau should have a forestry committee made up of men conversant with woodlot conditions, and the lumbering industry.

9. Projects of secondary importance.

(a) New England must soon face frankly the necessities of its land utilization. This cannot, of course, be done until we know just how much of our land area is used for tillage, pasture and forest. In other words, we need an inventory of our land resources. It is recommended that a plan be worked out and presented next year, with this object in view.

(b) The growing use of our woodlands for recreation purposes has created a serious trespass problem. Automobilists, hunters, and other tourists are too apt to cut trees and shrubs, break down fences, and set fires without regard to the woodland owner's rights. Some method must be devised to make the people realize that they must respect property rights of land owners.

10. Permanent Steering Committee.

To see that the various suggestions of the Forest Products committee are carried out it is recommended that a steering committee of three be appointed by the Chairman of the Conference.

Selling Blister Rust Service

by

Professor C. H. Collingwood,
Forest Extension Service, Cornell University

The blister rust agent is not a salesman, he is a worker, whose salary is provided from public funds. The only service that he sells, is

his own time and ability, and the transaction is between him and the federal or state department which employs him. It is not his duty to sell the blister rust idea, in the sense of putting it over upon an unsuspecting public. All too often to sell in that sense is to betray, and the disappointed public looks remorsefully at its worthless receipt, and remarks disconsolately, "Sold again!"

I would prefer to think of these men as teachers whose duty it is to carry to the public the fullest and most reliable information regarding white pine blister rust, to acquaint them with the service extended by the Federal government and by the various State governments, and to get them to adopt the control measures and accept the service which is offered. Even tho he may get the public to accept a service, the agent falls short of being a salesman, because there is no actual exchange takes place, - no quid pro quo. The service is distinctly a benefit conferred upon the property owner,- an exertion made on behalf of his welfare. I think that this idea might very well be stressed; to be sure, the government has a broader and longer vision than this might imply. The government, and thru it the agent, see not merely the immediate benefit to the property owner but more especially the economic prosperity (present and future) of his community, of his state, and of the country as a whole. White pine blister rust, if allowed to run unchecked is bound to have a decided effect upon the future timber resources of this continent.

Now, how are you teachers going to convince the general public that white pine blister rust really exists, - that it is to the advantage of the pine owner to accept and encourage some of the exertions or services which you are anxious to make in his behalf?

There are three principal methods by means of which you can carry

your message to the public: the reading or publications method, the lecture method, and the demonstration method. It has been stated that we remember seven-eighths of what we do, three-eighths of what we see, and only one-eighth of what we hear or read. Even tho we may admit this statement, I think we will all admit that by means of the printed page we have available a larger audience than thru any other source. It behooves us then to use it, and keep using it, thru as many, as varied, and as attractive forms as possible.

Some valuable pioneering has been accomplished through the colored posters, which for several years past have confronted the average men in railway stations and schoolhouses, on telegraph poles along the public highway, and in the furthermost interior of the forest. These attracted the eye, they were easy to read, and they often caught the man when time was hanging heavily on his hands.

Bulletins have been published and sent broadcast throughout the land, articles, more or less profusely illustrated, have appeared in newspapers and magazines, and more recently the disease and its control have been portrayed in the movies. Just because all this has been done, don't think for a moment that that field has been exhausted. It will never be exhausted so long as children grow up and learn to read; so long as folks are subject to moods, and whims, and changing opinions; so long as newspapers and magazines are daily replaced by new issues, and so long as there are new ways of expressing an old idea.

At present the county newspaper and the Farm Bureau Newses present an almost virgin field. Here is a chance to secure the publication of an article describing a local infection, or still better, the eradication of a local area. It is not enough to merely say that gooseberries are being

pulled on John Brown's property, but the why and the how of it may well be included. Folks are interested in anything which affects the welfare of their neighbors and may affect their own welfare.

Very often a window in a local Farm Bureau Office, the Chamber of Commerce, or the newspaper can be drafted into service. County Agent K. D. Scott of Warren County, New York, recently set his people to thinking by means of a sign with letters in red which boldly declared, "'THIS PINE BLISTER RUST DOESN'T AMOUNT TO A DAMN!' - Says the man who doesn't know." This caught the eye, commanded the attention, and in not a few cases struck a sympathetic chord on the part of certain individuals who didn't know what blister rust is. The sign called their attention to blistered pine specimens which had been pulled from a nearby plantation, set out in 1920 and the gooseberries eradicated in the following autumn. The infection took place during the first summer. "MORAL - eradicate gooseberries before planting pine." By this means Scott gave information to hundreds of people and paved the way for a personal interview by the local Blister Rust Agent.

According to the pseudo-psychological statement already referred to the lecture method is but little more effective than the reading method, - "we remember only one-eighth of that which we hear or read". In each case it depends upon the way it is presented, - also upon the people who receive the message. Some of us are more accurately "ear minded" than we are "eye minded".

The spoken message is dependent to a very considerable extent upon the personality of the speaker, - he should not only command the attention of his audience, but their respect and confidence as well. Sometime it is desirable to import a speaker from the outside, for it has been aptly said, -

"A famous man is merely an ordinary man when he is away from home." But this does not minimize the importance of the local blister rust agent. His character, and the way he is accepted by the public with whom he comes in daily contact will have much to do with the reception which will be extended any speaker from the outside, - to say nothing of his influence on the progress of the work.

The lecture should be accomodated to the audience. Different phases of the disease, of its effect upon the community, and of the control measures may be emphasized according to the occasion. It is usually possible for one who thoroly knows his subject to do this. Above all, the speaker should be urged not to read his lecture. It is a rare man who does not lose a considerable portion of his personality when he allows himself to divide his attention between his audience and his paper. The general public finds blister rust a difficult subject to follow, and there should be no added difficulties of following the speaker.

As a result of investigations made upon large numbers of students it has been demonstrated, that the average mind grasps the beginning of a talk, and the end of it, while much that falls between is indistinct. It is well to remember this, and have the opening remarks as well as the closing paragraph firmly in mind. A speech as well as a journey is remembered by the stops that are made, and many a good speech is spoiled for lack of good terminal facilities. This is especially true when it is remembered that the average mind has difficulty in following a certain train of thought for more than twelve or fifteen minutes.

Specimens of blistered pine and infected leaves of gooseberry or currant are useful for illustration, but often seriously distract if passed around during the lecture. On the other hand lantern slides may be given a

definite place, because all the minds are supposedly concentrated upon the same subject at the same time. Under some circumstances moving picture films provide an illustrated lecture, during which very little speaking is necessary. As a drawing card the movie is without a competitor, and the idea of a free movie draws people from all the cracks and crannies of the countryside. To be sure, they are hungry for entertainment, but at the same time their minds are open to new ideas.

The lecture like the printed story is a splendid means of giving information, but it seldom gets action. Men who can get action by such methods are in demand in every field of effort. Most of us are fortunate if we can get an individual to seem favorably inclined to take action. Here is where the value of the personal interview comes in. The man has seen the posters, he has heard a lecture, perhaps he has read a bulletin or two, but it is not until he has talked it over with a man in authority that he is willing to put his name on the dotted line, and contribute his efforts toward cleaning things up.

The demonstration is the most effective of all these methods. It is also, usually the most difficult to prepare. We speak of the demonstration method as one which teaches by doing, yet one is seldom able to have a large number of people without previous organization and training go out and pull gooseberries.

In preparing a blister rust demonstration, one must first of all find the blister rust. That found it is usually not difficult to find plenty of currants and gooseberries. For purposes of demonstration, the older and more disastrous the infections on the pine, the more convincing will it be. In some portions of the northwest it is possible to find eradicated areas within a comparatively short distance of areas where ribes

continue to grow unmolested. One of the most remarkable demonstrations that I have ever seen is in Warren County, N. Y., in a pine grove from which all ribes were supposedly eradicated in 1918. By chance a few large gooseberry bushes were left in one corner of the lot. Infections continued, each year, from these bushes, for a radius of thirty to fifty feet, but everywhere else in the woodlot there was no evidence of infections after the eradication. Infections can be found in this grove dating back for a period of nearly ten years, but except as already mentioned there are no new ones since 1918. A group of property owners can be taken into such a woodlot, and while they will have no opportunity to pull gooseberries, they will see the results of having had them pulled, - and they will have been given an opportunity to see, and touch, and if necessary taste blister rust on pine. Under such circumstances, and especially with a competent leader, "Seeing is believing". But again, to get definite action the personal interview is usually necessary.

Perhaps you ask, - "How is the Blister Rust Agent going to carry out these three methods of teaching?" From the experience gained in New York State I would say that there are organizations which stand ready to extend to him every privilege. The country newspapers offer a splendid field for considerable published material - if it has news value; the Grange, women's clubs, business men's and lumbermen's associations, schools and Boy Scouts all offer excellent opportunities for lectures and talks; Boy Scouts may offer an opportunity for field demonstrations, but each of these affects only a small minority of the people who should be reached.

To one who looks over this field of opportunities it seems as if the Farm Bureau was especially organized for just such work. The Farm Bureau organization exists in each of the several agricultural counties of

the northwest, and offers a channel thru which a large group of pine owners may be reached. The County Agricultural Agent is the local point for a live and permanent organization whose purpose is to develop the agricultural communities of his county. White pine is widely recognized as an important agricultural crop in the northeastern states. Anything which threatens that crop threatens the prosperity of the community, and the County Agent will be found alert to take the lead in any movement to gain its control. Personal interviews and special demonstrations will be worth while in his case, for as soon as he is fully aware of the seriousness of the disease, and the means of control you will find him a ready cooperator. The pages of his Farm Bureau News will be open to well written articles, while with the aid of his committeemen lectures, and later field demonstrations can be arranged for in the strategic places.

One might go further and interest the local lumbermen, the banker, the ministers, and various other leaders, but the king pin, - the one around whom all of them will rally is the County Agricultural Agent. With his cooperation and the aid of his organization I believe that a tremendous amount of work can be effected in a remarkably short time.

In a few words "selling blister rust service" is largely a matter of persistent and painstaking teaching, and that can be made most effective by enlisting the aid of the organizations and men in the community.

The Work and Supervision of the County Agricultural Agent In Relation to Pine Blister Rust Control Work.

Chas. A. Taylor, Assistant County Agent Leader

Cornell University

The county agricultural agent work in New York State is carried on by cooperative arrangement between the Agricultural College and the county. Each year a written agreement is drawn up by which the work to be done and the facilities to be used are carefully defined in the case of each county. This agreement is drawn between the executive committee of the Farm Bureau Association, representing the county and the Director of Extension, representing the public institutions which include the College, the State Department of Farms and Markets and the U. S. Department of Agriculture. A detailed program of the work to be undertaken during the year and a detailed statement of the financial budget under which the farm bureau will operate during the year are included as parts of the agreement.

While the supervision of the work of the county agent is thus a matter of joint concern, every effort is made to secure local responsibility and initiative on the part of the county association. It is deemed desirable that county programs of work originate as closely to the people as possible and that the county assume a large part of the financial responsibility for maintaining county agent work in the county. The administrative authority of the Director of Extension is employed to foster, encourage and guide local effort in the solution of local problems rather than to secure the execution of college made plans for agricultural improvement.

The Smith-Lever Act, which passed Congress in May 1914, not only furnished financial assistance for county agent work but it also established relationships between the U. S. Department of Agriculture and the various

states for the conduct of extension teaching. Under this act an agreement was worked out by which all educational or extension work of the department should be done in each state in cooperation with the State College in that state, and the States Relations Service was created to handle the relations with the states under this arrangement. New York State College has, in turn, found it advisable to handle all extension work in the counties directly through the county Farm Bureaus Associations. By so doing they avoid duplication of effort and confusion in the conduct of extension work and assure the adaptability of the work to local conditions.

The local machinery for carrying out extension teaching in the county consists of a local association of people who are interested in agricultural development and the dissemination of information relative to agricultural questions. In and around this farm bureau association have been developed quite a complete system of committees, the purpose of which is to secure local initiative in planning the work of the county agent and to insure local cooperation in getting the teaching actually put into practice on the farms.

Besides the executive committee or board of directors, upon which devolves responsibility for the administration of funds and general direction of the work, there are in operation in most counties project committees, which study the needs of various farm enterprises in the county, recommend work to be undertaken and assist in carrying out the program.

Committees of leading farmers are organized in each community of the county. These community committees constitute a most effective means of getting agricultural extension teaching to the rural communities. They are in general composed of the best men and natural leaders in the communities. They, better than any other group, can determine what work is needed.

Theirs is the duty to work out the local program for the community and to arrange for its execution through local leaders who become responsible for the success or failure of the special piece of work in the community and who work in close cooperation with the county agent. There are 1312 of these community committee men and leaders in the twelve counties in New York State where pine blister rust control work is in progress. They should be of great assistance to blister rust agents in securing local contact and in promoting eradication work as a community project.

I have conferred with the county agents and the executive committees in each of the twelve pine counties of New York State and we have gone over the work proposed in pine blister rust control. In every case I found both the agent and the committee keenly interested in the proposition and ready to lend their facilities to the blister rust agents. In ten of the counties where it has seemed desirable, definite written agreements were drawn up with the committees by which they pledge moral support to the work, and offer the use of office facilities, including stenographic assistance when desired.

How can the county agent and the farm bureau facilities be used in this educational campaign which you are conducting? In considering the question these several ways have occurred to me:

a. By Giving Moral Support to the Movement. The farm bureau is already well and favorably known and its advice is valued by most rural people.

b. By Aiding in Publicity. The association publishes monthly a "Farm Bureau News" which has wide local circulation and most county agents become expert in using the usual means of publicity, including the local press, circulars, meetings etc., as well as the Farm Bureau Newses.

c. Advice to the Pine Blister Rust Agent. The county agent has, perhaps a wider acquaintance in the county and a more intimate knowledge of local

conditions than can be found elsewhere in the county.

d. Office and Clerical Assistance. Agents are welcome to make headquarters at the farm bureau office, the location of which is well known in all the counties. Pine owners desiring to get in touch with the agent could readily do so through the Farm Bureau office. Close contact with the county agent will promote mutual understanding.

e. Use of Community Committees and Community Programs. It would seem desirable that communities having extensive pine areas might well adopt the eradication of Ribes as a part of the community programs of agricultural improvement.

f. A Pine Survey. In New York we have felt the need of more detailed local information as to the location of pine lands. County Agents can, through their community committees, easily secure such information when desired.

Cooperative relationships in New York State were not set up until late the past summer and blister rust agents have not been available in all the counties interested, but our experience this far is sufficient to indicate large possibilities. County agricultural agents have become much interested in the campaign and are helping arrange meetings, are putting out local publicity and even visiting farms to secure prospects. One agent reports 20 farm visits since September 1st on this subject. Our agents have attended 22 blister rust meetings and have helped arrange for 41. Local committeemen have helped arrange 31 meetings and are showing much interest in eradication as a community problem. In Essex County a special committeeman has been chosen in each community to assist with the campaign.

I find that the county agricultural agents have given the blister

rust control much publicity in the local press, at fairs, by circular letter, advertising meetings, sending out printed matter to pine owners, making announcements and explaining the work at meetings, making displays of posters and other materials in the farm bureau office and in other ways. Frequent articles have been run in the Farm Bureau Newses in all the counties in the pine section of the state. In seven counties the pine blister rust agent is making the farm bureau office his headquarters in the county. Clerical assistance is available in all these counties.

During the past autumn we have made a start in the direction of using farm bureau facilities to help promote your work of controlling pine blister rust. Our Agents feel that closer cooperation and more frequent contact will be mutually beneficial. We hope that greater use will be made of the bureaus in all the counties.

Mutual Benefits from Cooperation Between Agricultural and Blister Rust Agent.

by

J. A. Purington, County Agent,

Rockingham County, New Hampshire.

Cooperation of any kind must first be based on a clear conception of the need or the importance of the project or problem. Secondly a clean cut idea of the object in view; and thirdly upon the willingness of the parties concerned to work together in carrying out the project. It is with these three factors in mind, together with one more, i.e.: "Proper Methods", that agents can accomplish the final goal or "Results."

The first factor or need usually arises through necessity, especially

if it is to remain as a sound proposition. With the necessity comes an object, by which, if we apply proper methods and cooperate mutually, we obtain results.

"Importance of Our Forests."

There was a time in this Country when the woodlot was considered as merely a growth which could be cut off once in a period of 35 to 40 years and net a good income with little thought as to its care in the meantime. In fact, aside from obtaining hard wood for home uses and the ever present yearly taxes, it is a question if the average owner gave it very much thought from year to year. Times have changed with the increasing scarcity of forest products, disease damage, and present system of woodlot taxation. Therefore, we can no longer consider our woodlots as merely Nature's gifts, as a growth, but must consider it as a CROP. Many in our Country are considering our woodlots today as a crop, and more are bound to do so in the future. One obstacle is the fact that forests in the States at present are so managed as to be long time crops. The average farm woodlot owner thinks in terms of crops of short rotation and for that reason it is hard for him to consider it as a crop in the same sense. Also, up until recent years comparatively small areas h ve been planted to forest trees and many of our farmers consider a crop as something you plant. However, the time is coming when more trees will be planted, we will have different age stands, and therefore, instead of cutting a crop every 35 years, it can be so arranged as to be cut in terms of shorter rotation. Forests in European Countries have long been considered a crop and handled as such. Having an interest in Forestry, I enlisted in the 20th Engineers Forestry Unit, the largest unit in the Army, serving 19 months, 17 of which were overseas. We lived in the buzz of the saws which ran night and day in the pine areas of France. It there became by privilege to see how Forest areas were re-

garded in France and how dependent people were upon their products. It was with regrets that the Peasant people in Southern France saw the Forests cut, aside from the fact that they were going to help win the war. Why was this true? Just because of the fact that by handling the forests as a crop, it gave them labor in tapping or working the trees for pitch, and as well netted the owners money for the pitch turned into turpentine. Year after year this had been done and by cutting the areas it was to deprive many of a permanent income. It was also interesting to see how every piece of wood produced was used, for some purpose. Take the willows for illustration which have their top growth removed year after year for their withes to make baskets or larger growths for wood. Sometimes men climb to the top of high trees removing withes for such purposes. Charcoal is another use for surplus forest products. Nothing is destroyed in the hard wood forests, the small underbrush is removed which is used and also assists in preventing forest fires. Much of this work is done by women. Forestry as conducted in France is based on necessity and future anticipations. They regard it as a crop such as we must.

Now let us consider our Forests from a different angle, as a crop from the financial point of view or as a crop in comparison to others. Take New Hampshire as an illustration which for size is probably fairly representative of New England. The report of the Forestry Commission of 1919-20 gives the following figures.

Total land area 5,663,022 acres.
Agricultural " 1,110,099 acres (improved land and good pastures or 19%)
Young valuable growth 1,687,402 acres 29%
Waste land 1,745,542 acres 30% inferior growth
Merchantable Timber 1,119,973 acres 19% (25% of which is pine)

From the above figures may be seen that the merchantable timber is

about the same as the area of tillage and good pasture. The waste land is about the same in area as the young valuable growth.

According to the report we have 7,810,766 thousand feet of merchantable timber at $11,00 per thousand and the value of the timber would be $85,918,426 which is about 4½ times the value of the livestock in the state. At the present rate of cutting our merchantable timber would probably last about 13 years after which we would have to draw on the young timber with the exception of possible imports. This other 1,687,402 of young valuable growth would not supply the needs of our State assuming losses. The waste land, which is approximately equal to the young growth land, if reforested, would eventually double the output of timber and supply our local needs. Considering the area of New England it would be hard to say the exact proportion which is best adapted to Forestry but conservatively speaking it is at least one half.

Having seen that Forestry is a crop of great value we should have a clear cut path for the object - "To Cooperate in all ways possible in order to save and protect our Forest Areas." With this end in view there ought to be a mutual willingness for the Agricultural and Blister Rust Agents to cooperate. Mutual cooperation between the Blister Rust Agent, Mr. K. E. Barraclough and the County Agent in Rockingham County has been the keynote with results beneficial to both. Mr. Barraclough came to the County, August 1, (1922) and at once commenced to take an active stand in Blister Rust as well as other Forestry work.

"Methods"

We considered the work together, learned each others point of view, combined trips where possible and held many meetings jointly. One important cooperative step in the county was to hold a practical field Blister Rust

Demonstration in an area which represents one of the worst infestations in the State. County wide publicity was given the meeting by sending notices to all of our Farm Bureau membership of about seven hundred and fifty. The Blister Rust Agent also interviewed many pine owners personally. A couple of days before the meeting blue-prints made by the State Forestry Department "Follow the Arrow to the South Deerfield Demonstration, September 21st, 1922," were tacked all along the main routes by the Blister Rust Agent. This demonstration involved an excellent practical demonstration of what Blister Rust will do to the white pine and a talk on Forestry Reproduction by J. M. Foster, State Forester. A second cooperative step was the attending of our Farm Bureau and Cooperative Extension work Planning Meetings, by the Blister Rust Agent. These meetings were county wide in scope.

A third cooperative step came thru the suggestion of the County Agent to have a Forestry County Project Leader appointed which proved agreeable to the Blister Rust Agent.

A fourth cooperative step has been in the matter of publicity of meetings. When a woodlot, Blister Rust, or any other kind of a meeting was to be held in a town notices were sent out to our Farm Bureau membership signed both by the Blister Rust and County Agents.

A fifth cooperative step was the report given and exhibit arranged by the Blister Rust Agent at the Annual Farm Bureau meeting.

Results.

1. Of Field Blister Rust Demonstration in So. Deerfield.

Thru publicity and effort over 100 people, including Forest owners, Blister Rust Agents or Forestry Leaders, and others interested, were present. It gave those present an opportunity to see the necessity of protecting the pine, to learn thru the talk of the State Forester, Mr. Foster,

reproduction methods or to ask questions, on other phases of Forestry. The people present also realized as never before the damage Blister Rust will do and unquestionably are spreading the truth of the situation broadcast.

2. Of cooperating in holding the planning meetings.

As a result the following Forestry program was worked out.

Blister Rust Talks	15
Woodlot Demonstrations	9
Consultors secured	10

The nine woodlot demonstrations were held plus one more which was held prior to Mr. Barraclough coming, making a total of 10 with a total attendance of 80.

Many men consulted the Blister Rust Agent as to Forestry problems, and many future visits were scheduled.

Recognition of Forestry as a crop in the county Extension program of work along with other phases of Agriculture. This last factor is very much worth while.

3. Forestry County Project Leader.

By the appointing of a Forestry County Project Leader it gave Forestry a place along with the other county projects as well as a person interested from the wider point of view. A list of the County Projects together with the Leader is published in our Farm Bureau paper, "The Rockingham County Farmer" and as may be seen this gives publicity to Forestry as a Project.

4. Publicity of meetings. By sending out notices to our Farm Bureau membership with both the signature of the Blister Rust Agent and of the County Agent it signifies cooperation and the fact that the county agent believes in or is supporting the work.

5. At the Annual Farm Bureau meeting the Blister Rust Agent submitted a report along with the county and home agent, which was recognized. A Forest Blister Rust Exhibit also held a place along with an Agricultural Exhibit arranged by the County Agent.

It might be added that at other Fairs like exhibits were prepared.

6. In case of trips we cooperate at times which usually means a saving in expense.

7. As a result of Mr. Barraclough's supervision work since he came to the county on August 1st, 1922 a total of 46368 were removed involving 13,116 acres at an average cost of 12.4 cents per acre for protecting the pine or one of our valuable crops in the county.

Conclusions.

By mutual cooperation of the Blister Rust and the County Agricultural Agent it is possible to carry out in the most efficient manner, the protection of our forests which are a very valuable crop. As a result the County Extension program of work is also strengthened as well as the accomplishments of both agents. Thru such cooperation it gives a double force in bringing before the people the importance of protecting our forests and carries out a project of great future value.

Auxilary Educational Forces

by

L. E. Newman
State Leader, Blister Rust Control
New Hampshire

Not long ago, the writer ran across, in a well known periodical, an advertisement by the American Association of Advertising Agencies. Quite naturally, its purpose was to stimulate and increase the business of the

association's members, but it contained a thought which, I believe, is worthy of the consideration of all of us who are engaged in administrative work in Blister Rust Control. The meat of the entire advertisement is to be found in the following statement.

"The trouble with American business today lies not so much in the selling methods employed; but in the lack of sufficient and proper preparation calculated to produce a receptive mood in the mind of the buying public". While the word "advertising" does not appear in the foregoing statement, nevertheless it is quite obvious that the phrase "sufficient and proper preparation" is intended to convey the same meaning. I was quite forcibly struck by this statement, inasmuch as I am of the opinion that had more preparatory work been done in the past in connection with Blister Rust Control, less opposition and indifference would be encountered by all of us who are actively engaged in endeavoring to sell Blister Rust service. This statement is not intended to be in any sense a criticism of any of the agencies which have been or are at the present time carrying on Blister Rust work, as I am more or less acquainted with the various situations under which all the states have been laboring during the past few years. However, I am quite convinced that it might have been a much better policy for the various states to have spent at the beginning more of their Blister Rust funds in direct publicity work such as advertisements, circulars, posters, etc., and less in control work. I am quite aware of the fact that there has always been on the part of state and government agencies a distinct aversion towards adopting in any of their work many of the principles long considered sound in the business world. In this connection, there has been an unusually marked reluctance to advertise or exploit state or government work through the medium of advertisements. It would seem as

though the support of the public is quite a desirable thing for state and government departments, and yet it is only in isolated cases that the same methods have been utilized to secure such desirable support, as is pursued by business interests in general.

However, as the purpose of this paper is to describe some of the educational methods that have been employed in New Hampshire, I will devote the balance of my allotted time to a description of what we have been trying to do along these lines. There are so many varied forms of publicity which we have tried out that it is impossible to give a detailed description of all of them at this time. The following list is therefore submitted and only a limited outline of the application of each will be given.

Auxilary Publicity Methods

1. Field Demonstrations.
   a. Methods and Effectiveness of Eradication.
   b. Identification and Effect of the Rust on Pines.

2. Local Meetings.
   a. Farm Bureau.
   b. The Grange.
   c. Business Men's Clubs.
   d. Boy's Clubs--Extension Service.
   e. Boy Scouts.
   f. Schools.

3. Fairs.
   a. Town and County.

4. News Articles.
   a. Farm Bureau Bulletin.
   b. Local Newspapers.

5. Window Displays.

While there has been an attempt made in New Hampshire to give field demonstration of Blister Rust and control methods to the public, it was not until the past season that a definite policy was laid down which required that a determined effort be made by the person in charge of control work to hold at least one field demonstration meeting in each town where eradication

was being conducted. It also stipulated that as many demonstrations as possible were to be given of the damage caused by Blister Rust. While, of course, it is true that in some instances, it has been impossible to get any of the local people to devote even so much as an hour's time in this way, nevertheless, in the majority of towns in which control work was conducted during 1922, demonstrations were given of crew methods and appearance of the rust and the damage it caused. The writer believes that such meetings are of inestimable value in view of the fact that the average run of people have absolutely no conception of how control work is carried on nor have any idea of what Blister Rust is capable of doing to the white pine. These demonstrations, particularly of crew work, show quite clearly to the local people that the work performed by the Blister Rust crews is not the easy job or the piece of graft that they commonly supposed it to be. In one of these field meetings, one pine owner remarked that he would not take a job in a Blister Rust crew at $100 a week; while another individual made the statement that he was astounded at the number of currant and gooseberry bushes that were growing wild and further intimated that he was surprised to find that such complete eradication could be secured.

Another effective means of securing wide publicity at a minimum of expense is through the medium of local meetings held either indoors or out, under the auspices of various organizations. In view of the fact that the Blister Rust educational work as now organized, is carried on in cooperation with the Farm Bureau, one of the principal sources and perhaps one of the best fields under which to hold local meetings is the very organization with which our men are affiliated. One Farm Bureau meeting held in the field during the past season was attended by nearly 150 farmers and pine owners. This gathering was staged on the famous "South Deerfield"

infection area and consequently, all of the persons attending had ample opportunity to see for themselves the effect of Blister Rust on pines of almost commercial size.

During the winter months, many organizations are glad to secure speakers on subjects relating to forestry and such organizations as the Grange, Business Men's Clubs and Chambers of Commerce, offer an excellent avenue for the dissemination of information regarding Blister Rust work. A tremendous amount of indirect publicity can be secured by educational agencies through connection with the Boy's Clubs of the Extension Service, Schools, Boy Scout and Y. M. C. A's troops. A large number of the members of these juvenile associations will tell their parents of what they learned at their various meetings and on their field trips. In addition to this, we quite often find that considerable newspaper publicity is given to the activities of these organizations and naturally, if Blister Rust work is the chief subject at any particular meeting, this fact is mentioned in the newspaper article.

There are very few states here in the east which do not have numerous town and county fairs beginning late in August and continuing through the early fall months. Often, anywhere from 10,000 to 50,000 persons attend these local fairs. They perhaps furnish one of the very best mediums for securing publicity to Blister Rust work. One illustration is enough to demonstrate the truth of the above statement. There was held, during the month of September, a three-day town fair at which the average daily attendance amounted to nearly 10,000 persons. The Blister Rust agent in charge of work in that particular county staged, through the courtesy of the managers of this fair, a Blister Rust exhibit and had one of his best men there during the entire period to explain the Rust and to secure the

names of persons desiring an examination of their pine woodlot. The man in charge of the exhibit talked with pine owners from forty different towns and received requests from nearly 300 people for an examination of their woodlot. The entire cost of such publicity work did not amount to more than $10. It is quite apparent that it would have been impossible to interview all of these people, coming as they did from so many different towns, for any such figure as mentioned above.

There is one period of the year, in which, on account of our rigorous New England climate, an educational agent is hindered considerably from getting out around his county and interviewing pine owners or carrying on pine scouting. As a consequence, it is highly important that the public is not allowed to forget the existence of Blister Rust. Aside from indoor meetings, this can perhaps be best accomplished through the medium of news articles printed in the monthly farm bureau bulletin and in local newspapers. If the agent makes it a point to collect information relating to the value of white pine, new indications of the Rust on pines and various other allied items of common interest, he will thus be equipped with the material for working up copy that will be accepted by newspapers and periodicals.

Another medium of securing a whole lot of publicity for Blister Rust and the work being done in its control may be found in window displays of infected pine and ribes throughout the various localities where educational work is under way. Most merchants are quick to see the advertising possibilities which such an exhibit offers them and in the majority of cases in this state, have been more than willing to give window space for often as long a period as a week. Such a display, carefully arranged and augmented by neat cards and posters provides a medium of advertising that is hard to equal. It quite often happens that in order to make such an exhibit more

effective, a card is placed in the window announcing that a free circular relating to the Rust may be secured in the store upon application. The merchant is, as a rule, always very glad to distribute any circulars as he realizes it brings people into the store, a great many of whom will perhaps make a purchase before departing. It has been impossible to describe in any detail these various methods which we have used in the effort to secure wide publicity for the control of the White Pine Blister Rust. The above outline may possibly offer means which have not occurred to some of the other states and there is little doubt but what other agents may be able to revise and make more effective some of these methods mentioned above. Even though White Pine Blister Rust work has now been carried on for more than five years, the writer wishes to make a strong appeal for more newspaper, poster and other printed forms of advertising.

So far as I am informed, there are few States, if any, in which the Blister Rust situation is so insignificant as to warrant any cessation of publicity work. As a matter of fact, through scouting and other investigative activities, we know, at least in New Hampshire, that the situation is extremely critical, and that it is only through immediate and concerted action that great loss will be averted.

I believe that a small annual allotment for direct avertising will do more good than if it were spent in control work, for while the expenditure of say, $500.00 may eradicate ribes over an area of perhaps 2,000 to 3,000 acres, the same amount, spent in advertising is more than likely to produce either town or individual eradication on as much as 25,000 or more acres. I am firmly convinced that before the public mind is aroused to the point of performing wide-spread eradication, it will be necessary to do more advertising than has heretofore been attempted.

Interviewing Pine Owners and Follow Up

by

M. E. Watson, Agent, Maine.

Interviewing pine owners is only a part of the educational work which is outlined for the agent to perform, I need not enumerate the other phases of the work, but I will say right here, that interviewing pine owners, to my mind, is by far the most important. Our final results are measured by the number of pine owners who become interested through our efforts.

In order to become successful in securing local cooperation among the pine owners, one must first consider the following requisites,

1st. The agent must be able to meet men and create a favorable impression.

2nd. He must have a good knowledge of his work and thoroughly believe in what he is selling.

3rd. Becoming one of the community and placing yourself on an equal basis with the man you are talking with.

4th. By having local interest in general forestry matters, such as planting, methods of lumbering, thinning and different kinds of diseases.

5th. Above all show extreme enthusiasm in your work.

In order to gain a favorable impression the agent should be convincing in his conversation. He must be polite by all means. Don't expect to gain results from a farmer when he is busily at work in the hay field, for certainly he has something else on his mind, but, you can make an appointment with him for some other day or perhaps for some night after supper. By doing this the pine owner can plainly see that you are taking interest in his welfare. Follow-up calls are necessary in almost every case.

The agent must have a good knowledge of his work and thoroughly believe in what he is selling.

Time and time again the farmer will ask, "What connection can currants and gooseberries have with white pine," they will continue on in saying, "I have lived here now going on fifty years and pines have been thrifty in the past and guess they will continue on." You ask him if he has ever seen blister rust before. He will answer, "Yes, I have seen it for 25 or 30 years and to my knowledge it isn't doing any damage. It looks to me like just a way to give some of you college fellows a job." In dealing with a man of this type, the agent must go slow and above all don't get irritated, give him the floor until he has told his story, then he is ready to listen. Tell him how the disease is new to America having been brought over from Europe sometime in the early nineties, and it was not definitely discovered here until 1906, and so on. In other words give him plain facts, refer to some other disease as the wheat rust, telling him that it belongs to the same group of parasitic fungi. Most farmers know of this disease.

Very often the Gypsy moth work will be recited to you. Don't tell them the money spent on that work was wasted, for it wasn't, they did a lot of good and are still doing it. You can say, however, that it is a pretty hard job to protect your wood-lot locally due to the migration of the larval stage, but with the blister rust it is a small matter to protect your pines locally by eradication of the host plant from which the disease breed.

Becoming one of the community is certainly a great help for the agent. I will advise the agents to live, at least, one week in each town of his district getting acquainted. You will find this a great help. Don't join the "Cracker-box Club" at the country grocery story. Its only a place of gossip and it won't get you a thing.

It is absolutely necessary for the agents to have a general knowledge in forestry matters. Almost invariably the timber land owner will ask you about other diseases, he will very often ask you about planting, thinning etc. If the agent can answer questions on these subjects, he will no doubt gain confidence in the mind of the pine owner. I will advise each agent to study Bulletin #13 The Care of the Farm Wood-lot. This is one of the best bulletins I know of for general information in forestry.

The Blister Rust Agent's Office System

by

Thos. J. King, Agent, New Hampshire

Prior to the coming of the so-called "Big Business", commercial activities were carried on in a rather non-de-script and careless fashion. Business was done with the "I trust you" factor playing the big part. Activities were of a limited nature and small in volume because the nature of things demanded that they be so. It was impossible to grow very large principally, I believe, because of the inadequacy of transportation facilities. System, as we understand the term today, was not yet conceived and things went on quite satisfactorily because the methods then in use sufficed.

With the development of transportation facilities, principally our railroad lines, which permitted access to all parts of the continent, "Big Business" developed with leaps and bounds. In the East factories and business establishments were built in great numbers, and their products were soon being shipped to all sections whence demands came for them. With this phenomenal development came the necessity for orderliness. The old methods of producing, shipping and accounting were grossly inadequate. A change was

urgently needed, a change was made and this change was called "system".

System, according to Webster, is an "orderly arrangement according to some common law, a method of transacting business, a plan or order".

Under systematic methods, order has come out of confusion and the apparently impossible has been accomplished. Branch houses in San Francisco are transacting business, using the same methods as are in vogue in the home territory in New York City. One order issued by the home office results in identical changes in method among hundreds of subordinate concerns. Many widely separated establishments, owned by same firm, are producing their individual parts, all of which when assembled together make but one complete product. And all of this has been accomplished by the application of system.

And so it is with the problem presented by White Pine Blister Rust. We need system. This factor has, however, been pretty thoroughly and successfully worked out in the field. Its value has been proven by the results accomplished and does not concern me at this time. In connection with the office end of this problem, principally because of the newness of the County Blister Rust Agent method, it seems to be generally conceded that there is room for improvement.

Office work, record keeping and report writing, to a great proportion of field men, is looked upon as a burden, because there training seems to have been along entirely different lines. They seem to have a great distaste for the detailed work involved and would very much prefer being at their work in the field, leaving this phase to someone else. Consequently this important work has often been neglected. The result is that when the necessity arises for the presentation of various phases of their field work, there is often great confusion and ofttimes inability to

produce readily the information needed. It is indeed very often true that, no matter how high a degree of efficiency is maintained in the field, inability to present in proper shape, the information which should develop as a result of this efficient field work, will result in the loss of much effective publicity and leave a poor impression of good work. The office of a County Blister Rust Agent should be a reflection and an advertisement of the good work he has done in the field. He need not strive to become a rival of Babson, but should endeavor to so coordinate both phases of his work that one will bolster up the other. A simple, effective system will adequately meet the needs.

The work of the County Blister Rust Agent may be properly divided into two classes: 1. Field Administration; 2. Office Administration.

1. Field Administration

   a. Work in Towns previous to Town Meeting
      (1) Scouting for Blister Rust
      (2) Interviewing townspeople and showing them blister rust in the field
      (3) Placing of Window Displays
      (4) Cooperation with Town Fathers
   b. Work in Towns subsequent to Town Meeting
      (1) Location of areas for eradication
      (2) Securing boarding places
      (3) Hiring of portion of men to keep crews filled
      (4) General direction of field work in town
      (5) Arrangement and holding of field demonstration
         (a) Blister Rust Damage
         (b) Crew methods
   c. Interviewing prospective cooperators and follow up work
   d. Public Lectures

2. Office Administration

   a. Correspondence
   b. Reports
   c. Publicity which includes
      (1) Articles for Monthly Farm Bureau Bulletin
      (2) Articles for Newspapers
      (3) Circular letters
   d. Files
   e. Maps

As the work in the County to which the writer was assigned grew, it became quite evident that some system of office organization was necessary which would satisfactorily weld together the invaluable information obtained from work being done in the field. A study of the situation showed that the following line-up would meet the present needs.

1. A filing system which would take care of
   a. Correspondence with
   c. Information filed by subjects
      (1) Towns
      (2) Individuals
   b. Reports
2. A filing system which would take care of Interview Cards
   a. Interviews and follow-up work of individuals
3. Maps which would properly record field accomplishments
   a. Infections found
   b. Areas eradicated
4. Specimens and Pictures illustrating blister rust and various phases of the work,

and the following developments were made:

Through the cooperation of the Agricultural County Agent, an entire drawer was given over to blister rust files, and was divided as follows:

1. One section for correspondence with Individuals
   a. Individual folder given each of those with whom considerable correspondence is held
   b. One folder grouping, alphabetically, correspondence with those written occasionally
2. One section for correspondence relating to work in various towns
   a. Correspondence with anyone relating to work in town whether
      (1) About town work or
      (2) Private work
   b. Reports of work done in town
   c. Copies of maps used by eradicating crew showing
      (1) Area thrown out by scout
      (2) Area worked by crew
      (These maps will be invaluable when the re-eradication work starts)
3. One section to take care of information filed by subject.

A steel file of sufficient size to take care of the interview cards was furnished by the State Forestry Department, and was divided as follows:

1. Main guide marked "Town Data" (Blue)
   a. Guide card with name of town (alphabetically) (Manilla)
      (1) Summary of Town work yearly (town and private work) (Buff)
      (2) Interview card filed alphabetically (White)
   b. Guide card marked "Projects Completed - Town" (Manilla)
      File alphabetically, cards of individual cooperators here as work on their land is completed or until it is known the land of interviewed has been done on town or other money
2. Main guide marked "Miscellaneous" (Blue)
   a. Subject file
      (1) Infection areas data, etc.

There are innumerable occasions when it is necessary to show the people in the county the extent of infection and control measures already applied within the limits of the county. Experience has taught that the spoken does not adequately tell the story. Consequently three maps have been worked up which so far have met the needs. One large map of the entire county has been prepared showing all infections found and areas eradicated to date. This remains in the office at all times and is hung in a conspicuous place. Another and much smaller map of the entire county showing the same information has been prepared for use at lectures. Still another use has been found for maps. Many times questions are asked in the field about infections found and areas eradicated not only in the town in which the agent may happen to be, but in other towns of the county. During the past season the writer has carried a map of the county with him on which this information was recorded. It was large and had to be folded and it was not long before it was reduced to a pitiable condition. The writer has developed a method by which maps of individual towns may be mounted on cardboard, inserted alphabetically in a cardboard covering, and carried in his portfolio. On each map is shown infections found and areas eradicated. This set of individual maps is kept up to date, infections being plotted in the field as they are found and the two other maps made up from this set. On all of these maps infections are noted with a triangle

and the various years work plotted on in different colors. Private work is shown by plotting the boundaries with broken lines, the name of cooperator printed in and the area colored in the same manner as town work to show the year worked. Areas bounded by roads are chosen as plots and numbered consecutively. This numbering is permanent to avoid confusion which might arise if areas were numbered each year work was done. If will also be a great aid in referring back or locating private cooperators' lands in a permanently numbered area.

Many times questions with reference to various phases of forestry have developed. It has been the writer's experience not to have been able to answer all of them and some of them only in a general way. After these same questions have been asked a number of times and showed a likelihood of continually cropping up, a study was made of them. Through the cooperation of the Federal Department a fairly complete set of publications has been made and arrangements were made this winter for a more complete set being sent the agents. These publications are kept on file in the office and are consulted as occasion demands. The ability to give the information asked for by the public has given the writer a higher standing in the county than would otherwise have been the case. The "Reference Library" as the writer calls his set of publications is a necessary part of the agent's equipment.

To make his equipment complete and meet the needs of the work the writer has installed, in a conspicuous place in the office, at least one good specimen showing the effects of blister rust on pine. While it is not possible to always have a specimen showing the disease in its various stages, it has been possible to augment the specimen with suitable pictures furnished by the Federal office which show all phases of blister rust in-

cluding eradication work.

Under the present system there is no opportunity to secure stenographic help at time when it is actually needed, in fact the agent is positively forbidden to avail himself of such help. It means that during the stress of an extremely busy field season, the office end of his work, important though it may seem to him is neglected and necessarily so. I believe that when the necessity presents itself, the agent should be authorized to secure such help.

In closing, while it is to be admitted that the point of view of the writer is that of a New Hampshire man, and it is known that all states are not conducting their work along the same lines as exist in New Hampshire, it is the feeling of the writer that the same principles as set forth in the foregoing paper, may be applied, at least in part to meet the various needs of the other states.

The Supervision of Ribe Eradication

by

S. V. Holden, Agent, Vermont.

Supervision of Ribes eradication simply means handling the work in such a way that the Ribes will be eradicated at the lowest possible cost. Therefore, I think first of efficient work, second of the lowest possible cost that will not interfere in any way with the efficiency of the work. There are many things to consider in order to obtain these two points.

A good reliable, conscientious foreman is a great help to the Agent. To be obliged to retain a second-class foreman means second-class eradication work, extra work for the Agent and many times a dissatisfied coopera-

tor. I believe the Agent should instruct the foreman in all that pertains to the work he is about to start. The foreman knows the estimate which the Agent has given to the cooperator. Instruct the foreman to keep within this estimate. If he finds it is impossible to finish the work for the estimated amount, he should at once advise the Agent if the latter is available. Otherwise the foreman should inform the cooperator and do it soon enough so as not to check the progress of the work. The cost of eradication can be kept down by employing only good reliable men in the crew.

Study the topography of the area, make the checks where the Ribes are most abundant but do not check if the Ribes are scattered.

The scout system is very desirable under certain conditions and absolutely out of the question in some localities.

I find it wise for the Agent to take lunch with the crew - occasionally arriving at their place of lunch about 11:45 A.M. and notice the expression on the faces of the crew and foreman when they arrive 10 minutes before noon.

If the crew knows the Agent has laid out advance check plots it keeps them on their guard and if the Agent appears to the crew during working hours now and then, they do not get the idea that they are alone in the woods.

The unexperienced crew should check often. Checking with experienced crews oftentimes proves to be a waste of time and money, although when the foreman thinks the crew may have overlooked Ribes, he should call for a check at once and check in the opposite direction from first working.

Insist that every Ribes eradicated be placed where it is sure to die. I have seen 19 healthy Ribes cynosbati sprout and grow from the branches of one small bush that fell on the ground soon after it was eradicated. The Agent should see that a proper protective strip is eradicated around each

area. Make every effort to eradicate so thoroughly that re-eradication will be unnecessary for a number of years.

Acquaint the foreman with a number of areas before starting him with a crew. Never criticize the foreman in the presence of his crew. Local foremen do not leave the good impression with the cooperators and in the neighborhood as the imported foreman even though he is just as conscientious and efficient.

The Agent should make every effort to get the crew roomed and boarded near the area to avoid transportation.

The Lumberman and Blister Rust

by

R. W. Merrick, Agent, Massachusetts.

I have been asked to discuss what my experience has been with lumbermen and their reaction to the blister rust campaign.

Someone once defined a lumberman "as a man who cuts down all the forests to make a profit for himself without a thought for the coming generations". That may have been true at some time and perhaps is today true in some places, but I have not found it so in Worcester County.

The lumbermen and the large wood users I have met are shrewd, keen business men who keep one eye on the profits of today and the other on the profits of tomorrow. In other words they are fully alive to the fact that you can not eat your cake and still have it unless you keep making more cake.

Those of you who have had the pleasure of hearing Mr. Cook, Chief Forester of the Massachusetts Department of Conservation, speak at the recent Forestry Congress in Boston, or have had a chance to read his speach

will understand what I mean, for Mr. Cook goes into considerable detail in regard to Winchendon.

I was very much interested in this article because it was in this town that we started Blister Rust work last summer. If you have not read this report I will simply say that Mr. Cook cites this as one section of Massachusetts where there is a sustained yield of White Pine, and "Where, "he says,"we have woodusing industries using White Pine, that obtain their supply from the forest region around them, have been doing it for fifty years or more and from the knowledge that we can get through forest surveys bid fair to keep running at their capacity for fifty years to come."

I speak of this merely to show that we started blister rust work in a region where there is an abundance of White Pine, and, therefore, a large number of lumbermen and what amounts to the same thing large users of pine. I came in contact with many of them on my first visit to Winchendon and have been on intermit terms with them ever since and our relations have always been pleasant.

Perhaps a few words about my first visit to the town will show the attitude of these men better than anything else. I enlisted the good offices of Mr. Osgood, the Secretary of the Chamber of Commerce and started with him to call on some of the men.

The third man we saw listened to my story a few minutes and turning to Mr. Osgood said, "Don't you see that this man has a message that is of vital interest to all of us. Why waste his time by taking him all over town. It's something we all ought to know about and know about at once. Go back to your office and call up everybody in the business and arrange to give Mr. Merrick a lunch to-morrow noon. Then we can all hear the story at once, ask all the questions we want and see what is best to be done".

This suggestion was acted upon and the next day 27 came to the lunch, and I will be frank and say, "I'll tell the world" that crowd could ask questions.

Shortly after that I arranged to take a number of them to Temple, N. H. and look over the infected area there. Fifteen went on this picnic and came back fully impressed with the necessity of immediate action. A little later Mr. Morse who is now in charge of Franklin County, came to Winchendon to act as my assistant. I was just finishing some work for the Rodney Hunt Machine Co. of Orange and took Mr. Morse over with me one day to inspect the work and also get acquainted with these people as Orange is in Franklin County. Having found the work going along all right and it being yet early in the day we decided to keep on to Greenfield and see the N. E. Box Co. It took us considerably less than an hour to get their cooperation. I might add right here that their interest in the work was so great that shortly after this they asked me to make up a blister rust exhibit for them to put in with their box exhibit at the Eastern States Exposition in Springfield.

In the latter part of August the fairs started. We had seventeen in Worcester County and by dint of hard work including much night driving we put on an exhibit in all of them. I would like to say a word or two about these Fairs, because of their importance in our educational work. Our exhibit consisted of from three to six young pines showing Blister Rust in different stages and one small tree killed by Rust. One specimen each of wild gooseberry, wild black, red, and skunk currant. All these were potted in tubs and pails furnished us by Mr. Elisha M. Whitney of E. Murdock and Co.

In addition we had three or four specimens of trunk infection on

good sized trees, one or two broken tops, Riker mounts showing both uridinea and telia infection on the leaves of four varieties of Ribes, State map showing where infected pine had been found, cards and circulars for distribution and last but by no means least a registration book for pine owners who wished their land inspected.

The attendance at these fairs totaled 179,200. How many thousands had blister rust explained to them I do not know but there was usually two men with each exhibit and they talked their heads off from early morning until in some cases late in the evening. Of the people who registered with us less than a third gave the size of their holdings but those that did give it totalled 24,935 acres.

At all these fairs it was the lumbermen and wood users that showed the keenest interest. For instance I spent part of one afternoon at the Oxford fair where I met Mr. Chaffee the box manufacturer. I showed him the exhibit and told my story and he not only wanted his holdings of 6,000 acres eradicated, but introduced me to a Mr. Turner, a wood working machinery dealer who owns over 7,000 acres. We talked with him a few minutes when he said "Why sure I want mine done. How soon can you start on it?"

I have cited these instances for two reasons; 1st, to show how ready most lumbermen are to cooperate, and 2d, to show the value of fairs as a place to do educational work and to secure cooperation.

Another class who are eager to cooperate are water power users, owning forest land, to protect their water sheds.

To sum up the whole matter, I have found that the large owners of timber lands be they lumbermen, wooden-ware manufacturers, or mill owners, are ready and willing to cooperate with us if they are properly approached and told a clean, straight story. If you can get them to go with you to

some badly infected area or show them rust on pine or ribes on their own land so much the better.

I have found it a good practice to keep in close touch with these men, to see them at least once a week and give them a report done on their land, the number of ribes pulled or anything else you think will be of interest to them.

Follow the Golden Rule and treat them as you would like to be treated under similar conditions. The proof of the pudding is in the eating and the proof in this case is that by following the outline as given in this paper we have today orders for considerably over 125,000 acres of eradication work in Northern Worcester County.

Moving Pictures in Control Work

by

Fred F. Franklin, Agent, New York.

This means of publicity was made possible by the contribution of the Conservation Commission of New York with a fully equipped field moving picture machine, and a good mechanic to keep the outfit in proper condition. The equipment is all carried in a state Ford Touring car driven by the mechanic. We generated our own power of 110 volts by means of a 2 cycle engine fastened in the rear seat of the car. A long cable enabled us to transmit the power into a three story building when such a case was necessary. In many instances the building was already equipped with electric power, and it was not necessary to use the generator. The lantern used was an "Acme" of the bulb variety, and always gave the very best of service throwing a clear picture the size of an ordinary bed sheet.

The county farm bureau managers helped in choosing the places for the shows and did most of the publicity work. In some cases by sending out circular letters to residences of the locality where a show was to be put on. These places were sometimes very much isolated and again we gave shows in fair sized towns. Mr. Morse of Fulton County and Scott of Warren were the best cooperators in this respect. Little difficulty was experienced in getting access to grange halls, schools, and churches for the trustees were always glad to accommodate and even in most cases had good fires built before we arrived in the afternoon to set up the outfit. Generally the people around the isolated places were the most appreciative. In one instance a man walked four miles to see the show and another drove 10½ miles. The size of the place, the crowd, the feeling toward the work etc. to a great extent gaverned the material of our program. Two distinct types of programs were given but in each case our object was the same namely the fight against white pine blister rust. In the territories of Messrs. Woodward and Mogee the programs were generally arranged so as to be very intensive along the lines of blister rust and reforestation. In these two territories the crowds were more interested in the subject, and generally were smaller because the "out of the way" places were reached. In Mr. Nichols' territory a different plan was followed. The larger places were hit with a program as highly entertaining as possible so as to create publicity for "follow-up" shows next spring. This plan was necessary in his territory on account of its immense size and the limited time that we had. His policy I believe was a very good one for as best I can learn in each case we left a good impression and the show was much talked of. This then surely means that next spring, if it is at all possible, to continue with the show, Mr. Nichols will in his "follow-up" intensive shows in the "out of the way" places always

have a large and greatly interested crowd.

It was possible to adjust our program in different ways. We carried seven reels, seldom using more than five, so in this way we were able to change the nature of the program to a considerable degree. Again we could either carry on the show in a very serious manner or could divert to a more entertaining mood. The sizing up of the crowd always determined our method of procedure. Generally the smaller crowds were easier to become enthused and consequently more serious about the matter. In smaller crowds more questions were asked and it was much easier to become familiar with the individual in the audience. Of course the question might be raised here as to the type of crowd desired in view of the fact that the movie show is rather expensive. Is it more desirable to have a small crowd where actually getting in touch with the man and his questions is possible or a larger crowd where the program is more formal and the individual does not get to ask questions and become a part of the program so to speak.

It is hard to estimate the value of the show not only from the technical and practical side, but from the stand point of personal contact. This phase of the work differs from newspaper articles in that pine owners in the audience see something real and get into personal contact with the speaker and agent by asking questions whereas in newspaper articles the same person will probably skim over the article, his questions go unanswered and as a result not be greatly impressed.

The various reels stressed the importance of white pine as a commercial tree, its protection, fire control, reforestation and protection of game. Both U. S. D. A. and Conservation reels were used. The fight against Blister Rust and importance of control was brought out in the talk which was given immediately after reels showing the value of White Pine. One of the

features of the show was the reel in which the value of white pine was forcibly impressed upon the minds of the people. After the Pine owner really realizes what pine is worth to him then one can talk Blister Rust - not until then, for if the owner believes the cost of protection not equal to the importance of the pine he is not going to be interested. In a little over one months time 32 shows were given, the total attendance was 2,504 or an average of 78 persons to each show. The smallest attendance was 11 while the largest was 139.

Spring would be a better time for the shows than fall because the subject is fresh on their minds when actual eradication starts. This may be only a theory of my own and unfounded. The shows should seldom be given unless follow up calls are to follow in the near future. In one case however in my own territory I gave a show not to actually bring me in touch with pine owners but to subdue general feeling and criticism against public work of such a nature as Blister Rust Control. I believe it accomplished that result for now I do not hear near as much sarcastic comment and nagging. In my work last summer I had encountered one man several times who actually refused to talk eradication and almost refused to listen to my story. He finally did tell me that if I found some one wanting to buy pine land that he would sell his so long as I claimed that if he didn't eradicate the pine would soon "shuffle off its mortal coil" with blister rust. We then eradicated land adjoining him but nothing was said to him. Just after a show was given in his territory he came to me and wanted to know why his neighbor and I hadn't consulted him about eradication for he wanted to get his 586 acres cleaned up. His, now was a different story, and it came so quick as to give me a good surprise. The movie had convicted him. Perhaps a field demonstration in time would turn him but his work was of

such a nature that I could never get hold of him for a demonstration. Next to an actual field demonstration the idea is more impressively put overy by the movies than by any other means. The gaining of the personal contact with the pine land owner is where the chief value of the show lies. Perhaps Messrs. Woodward, Nichols and Magee could much better give you specific instances where much good has been accomplished for they have had so many more shows in their regions than I and have had a chance to follow up the work. I am sure that they heartily agree with me that it is the best method of publicity yet encountered and opens the path for intense follow up work. If the owner can be gotten to the show he is in a receptive mood. The agents need all the leads possible in reaching the pine owners. Names and addresses can be obtained at the meeting which will serve as a wedge for the agent and everything is then all set for an intensive follow up call.

Remarks on the Work in Essex County, Massachusetts.

by

W. T. Roop, Agent.

The work in Essex County was strictly a scouting job with two men. There were no Ribes in sour swamps. All Ribes were in pure fresh spring fed swamps. The crews were composed of farm help. One 7,000 acre estate was eradicated and the men on the estate were trained to carry on any re-eradication work.

State scouts eliminated much of the land. The remainder was worked by white pine owners with local help under supervision of the writer or an assistant. A definite plan is being worked out for the whole county. The aim is to complete all eradication of Ribes near the white pine within

three years. During the past season the entire pine areas of the town of Boxford were eradicated of Ribes and also a large acreage in Topsfield.

Scientific Investigations

by

Dr. Haven Metcalf, Office of Forest Pathology,

U. S. Department of Agriculture.

I. Outstanding results of the past year.

1. Spaulding (Phytopathology, May 1922) found sporidia unaffected by cold and the freezing of the Ribes leaves, and viable as late as December 3, when his experiment was discontinued. This unexpected result may be of more than ordinary significance in that it indicates the possibility of infection of pines in the winter, or even the following spring, by the overwintering of viable teliospores.

2. Colley and Taylor (Phytopathology, January 1923) have conclusively demonstrated the distinctness of C. ribicola and C. occidentale by minute morphological and statistical studies of the aecial stage.

3. Hahn has differentiated these two species in the uredo stage by their comparative reaction when grown on a number of varieties of Ribes.

4. The results of Spaulding's observations of blister rust in Europe are not yet assembled, but some outstanding results may be briefly indicated:

a. There is nothing in European conditions or history to warrant any change in our Eastern policy, or to indicate that we have

made any error of judgment in our program. Spaulding's observations particularly reinforce our views as to the virulence of Ribes nigrum.

b. Blister rust can and does kill trees of any age or size. The oldest pine trees observed by Spaulding in Europe were 118 years old, with a diameter of 1-1/2 to 2-1/2 ft. These trees were dead or dying with the blister rust. On account of the heavy consumption of large timber in Europe during the war, it is probable that no large forest trees of Pinus strobus could now be found anywhere in Europe.

II. Some subjects for further research.

1. Conditions governing the infection of pine. We have still much to learn regarding this critical phase, although the next examination of the inoculations already made at North Conway may yield considerable information. At present, our exact knowledge is limited to the infection of seedlings. Bearing directly on this subject of infection of pines, many more detailed laboratory studies need to be made of the longevity of sporidia from different sources, and under different conditions.

2. Selective eradication. Probably there is no short cut to knowledge bearing on this subject; in any case, experience will be the best guide. Bearing on this are the reports that certain species of Ribes in Rhode Island and southern Massachusetts are not producing the expected degree of infection. The correctness of these reports must first be carefully checked. If correct for last year or several years past, it may not hold for the future or for special years. It is necessary to know the exact varieties of cultivated Ribes involved,

as profound differences in the susceptibility of varieties of the same species have been demonstrated. The fact that these reported irregularities are in localities near the limits of the natural range of Ribes, or at least not within the optimum range, may prove significant in this connection.

3. Behavior, identity, and origin of the secondary fungi on pine cankers. There is much to indicate that these fungi may prove of significance in limiting aeciospore production, as well as modifying the effect of the rust on the pine.

4. Resistant pines. It appears to be the general belief that there are individual white pine trees resistant to the blister rust, but this fact remains to be proved conclusively. If there are such things as resistant pines, their seed might be utilized in future plantings. This is a tedious line of investigation, but in the end might prove more profitable than any other.

5. Follow-up work. Nothing that we can do is more valuable than this, and nothing is harder to find time to do at the times of year when it must be done. What is actually happening, as the disease progresses and our efforts to control it progress? Work of this type includes:

(a) Detailed records of the history of individual cankers, branches, and trees.

(b) Checking up on the status of the disease in control areas, in order to eliminate any unknown factors of infection.

(c) Checking up on the progress of the disease where it is uncontrolled.

III. General considerations -- Epidemiology -- History.

It is doubtful if research will bring out much more to radically change our methods of procedure in controlling the blister rust in the East, but undoubtedly important modifications will be introduced. We have picked up the nuggets in this problem, however, and the work remaining will be slow and laborious. We must deal with the large factors of climate, range, competition, etc. Our main difficulty at this stage is that in dealing with these larger factors and with the behavior of the disease, as a whole -- as an epidemic -- we have little to guide us. Plant pathology is an established science, but the science of plant epidemiology is yet to be written. So far as white pine blister rust is concerned, it is up to us to write it.

In the stress of practical considerations and the demand for immediate results in control, we must not forget that we have an obligation to the future in recording the various steps of both research and control. In other words, let us not forget, while we are making history, to record it. It would be an unfortunate thing if the pathologists and foresters, who have to deal with the next forest tree epidemic, were not able to obtain guidance from our experience with this one. In both research and control on the blister rust, we owe something to antecedent work and we are under obligation to pass something on to those who will deal with the next forest tree epidemic.

Scientific Investigations in Canada

by

Dr. A. W. McCallum, Pathologist,

Division of Botany, Ottawa.

There is no extensive program for research work. An experimental plot was established at Daisy Lake, B. C. Some work was done to determine when and where blister rust entered British Columbia. About 12,000 pine which came from Europe were shipped to Vancouver in 1910. Blister Rust was found on some of these original pines. Blister rust has therefore been in western Canada at least 13 years. No experimental work has been done in eastern Canada except to follow up experimental plots in Ontario.

State and Federal Inspection

by

J. E. Riley, State Leader, Vermont.

I do not quite see why I have been assigned the subject of State and Federal Inspection, as probably I have had as little experience with State and Federal inspection as any one of the State leaders. Compared with that of other states, our pine area is small and we have comparatively few crews in the field, consequently we have been less in contact with Federal inspection than other states. Our state inspection has been confined to inspection of eradication work by the State leader and the agents. All of which means that I do not feel competent to suggest a system of inspection to others who have had more experience in such matters than I have had.

However, I have some few ideas concerning inspection which I will

state and they may at least serve as grounds for discussion from which a better system of inspection may be devised.

The work of controlling the white pine blister Rust under the plan of cooperation between the Federal Bureau of Plant Industry and the several cooperating states naturally and by agreement falls into two main lines of endeavor, namely, education and eradication. The Bureau of Plant Industry assumes the responsibility for the educational work as conducted by the Federal agents, while the State assumes responsibility for eradication results obtained through the work of State crews, private labor and various combinations of these agencies.

The efficient administration of these two lines of activities requires more or less field inspection and it naturally follows that each cooperating party desires its own inspection of the work for which it has assumed responsibility.

However, in most cases a duplication or even an overlapping of inspection work is not practical because, first of all, it entails duplication of effort and expense, and secondly because the machinery already exists for proper and effective inspection that should be satisfactory to both State and Federal cooperators.

It is true that I am not intimately familiar with conditions in other states and whatever attitude I take in the matter of inspection is more or less influenced by my experience with conditions in Vermont. I can find no adverse criticism of the Federal inspection in itself as carried on this past year. On the contrary, it was thorough and effective and the inspectors themselves carried out their duties with the proper spirit of cooperation and helpfulness. Nevertheless, it seems to me that there is an unnecessary duplication of inspection which takes money and effort that might better be ex-

pended in other lines. I would have no Federal inspection other than that delegated to the Federal representatives within the state.

At the present time the various states inspect their own eradication work and the fact that this inspection is under the supervision of the State leader, who is an appointee of the Bureau of Plant Industry, should be guarantee enough that the eradication work is up to Federal requirements. I do not argue against field supervision of Blister Rust activities by the Federal Government. I believe that more frequent visits from the Boston and Washington offices, together with field trips about the state to ascertain conditions and to exchange views relative to these conditions would be highly beneficial and at the same time keep the Federal offices informed of what is going on in the field by first hand observation.

But to return to State inspection of eradication work. I can see where it may be contended that past experience has proven the necessity of outside inspection. It undoubtedly can be shown that there has been considerable poor eradication in the past that can be traced to improper inspection or lack of inspection within the State. Granted. But I might say that few organizations function perfectly at first and it is only through experience that perfection is reached. I believe that <u>now</u> various State organizations have accepted and are maintaining the high standard of eradication set by the Bureau of Plant Industry and are competent to handle alone the inspection of eradication work.

I do not mean to outline a system of inspection for other states because such a system must necessarily be adapted to existing conditions. I simply describe a simple, inexpensive system that is working in Vermont, and I believe will work in states where similar conditions prevail. In such states there is little available money, the permanent Blister Rust organi-

zation is necessarily small, and the cooperators are many. An inspection must be made of every job during operation. Many of these jobs are completed in a half day and inspection is obviously impossible unless by the agent or by a temporary inspector designated by him.

It has, therefore, been the practice in Vermont for the agent to act as inspector within his district. This inspection is augmented by occasional inspections by the State leader. In states where a supervisor has direction of eradication in a district either he or the agent might act as inspector.

Here objections will be raised that the agent has all that he can do with his general educational work and securing of cooperation. But with seven or eight months preceding the eradication season it seems that he should line up enough work to allow him to devote much of his time during the eradication season to the supervision of the eradication work. In the states where the before-mentioned conditions obtain, I can see no other inexpensive solution of the problem of eradication inspection. The agent's duties must comprise both education and supervision of eradication, including inspection.

There is the other field of endeavor which also requires some supervision and inspection, logically on the part of the Bureau of Plant Industry. This is the general educational work carried on by the agents. Should this work be inspected in the field by outside Federal inspectors or could not such field inspection be as effectively done by the State leader who directly represents the Bureau of Plant Industry in the state? I believe it could and should be done by the State leader or an assistant. Too much inspection from too many sources tends to decentralize authority and demoralizes the personnel. Put the matters of inspection up to the State leader, who is

responsible for work within the state, and perfect the organization through him and not by direct contact with the field force through outside agents. Let new ideas and inspiration come to the agents and other field men through communications, bulletins and news letters, but allow the immediate supervision and inspection to come from one source alone, the State leader.

I would not have you consider this as a plea for retaining personal authority, nor do I want it thought that we, if I may speak for the other field agents, feel personally slighted in any way by the present system of outside inspection. I know that no thought of investigation was in the minds of the Federal office when the present system of Federal inspection was inaugurated. I recommend its discontinuance solely because I believe it expensive and unnecessary and because the State leaders were put in charge of State work and should bear the whole responsibility of the work within their territory. I believe that more can be accomplished by centralizing authority and directing all efforts through one channel.

Ribes Eradication Checking Methods

by

W. J. Endersbee, Office of Blister Rust Control,

United States Department of Agriculture

Past experience has shown that check plots have not always been adequate to show conditions, that they have been too few in number, that they were not properly laid out or that some information was lacking after the inspector had left the field. In an attempt to improve our checking methods, a plan for checking is herewith presented.

Advance check plots have proved most satisfactory because they pre-

ceed and follow the eradicator and check only in those places where there were Ribes. They have been used too little in the past, and their extensive use in the future is strongly urged.

Check plots, laid out in areas previously eradicated have failed in part at least because they have not shown how thorough and complete a job was done over the entire area. It has been the rule to locate check plots in places where Ribes were pulled. This may be a perfectly fair and good check as far as it goes for it shows the percent of efficiency for the plot, but it fails to show that eradication was carried on over the whole area. Check plots have been laid out in such places and showed high percents of efficiency which were assumed to be correct for the whole area but further checks have shown Ribes within a few feet of the original plots.

There appears to be but one sure way of adequate checking under all conditions. That method is the strip line check which is an adaptation of advance scouting. Its advantages are that it shows conditions in all parts of the area, it leads thru all types, it has all the qualities of a plot plus the advantage of connecting a series of successive plots, and thereby checks ground that has not been eradicated as well as ground that has been eradicated, and it is flexible and therefore adaptable to all conditions.

For the reasons stated, it is recommended that the check plot be used in areas designated for eradication, and the strip line check supplemented by the check plot be employed in eradicated sections.

Classification of Checking Methods.

The method to be used in checking eradication will depend on whether or not the area has been eradicated. Therefore the methods will be classified into those used before eradication and those used after eradication.

BEFORE ERADICATION:

Scouting:

The purpose of scouting in connection with checking is to locate Ribes which must be included in advance check plots. Scouting should therefore be done in those places where Ribes are most likely to be found.

Advance Check Plot:

The purpose of Advance Check Plots is to obtain an absolute count on the number and kind of Ribes before eradication to compare with a similar count of the Ribes on the plot following eradication. These plots therefore must be located in places where there are Ribes.

Each plot should be definitely marked and fully described so that the inspector will have no difficulty in relocating it. A complete record of the number, kind, height and LBS of Ribes should be made and a description of the type, ground cover and topography given.

After eradication, the plot should be checked and Ribes records taken in the same way as before.

AFTER ERADICATION

Strip Line:

The strip lines may be run in one of two ways. First they may be run at regular intervals over the area so that a definite percentage of the acreage is checked by a gridiron system. Under this method the lines should run across topography so that the low land or more likely Ribes area will be gone over. This method has the advantage of being systematized to accomplish a definite purpose under any conditions.

Second, the strip line may run irregularly thru the area, very

similar to the way in which a scouting course would follow. The purpose of this method is firstly to determine what the general conditions are and secondly to seek out those places that contain Ribes or that may be especially in need of protection.

The length of the strip may be the distance across the area in the direction traversed, (2) the distance traversed in any one direction or (3) the distance traversed through a type. The distance traversed in any one direction is probably the best method to follow because it includes the first method while at the same time the third method can be included in it by dividing the strip into plots.

The strip should be subdivided into plots whose lengths correspond to the distance traversed thru a type. Thus if a strip ran thru three types, it should be divided into three plots.

The width of the strip line will depend entirely on the type thru which it passes. An inspector can safely examine 2 feet on each side of him or 4 feet in dense brush, 6 feet in medium brush, 8 feet in sparse brush, 10 feet in an open stand with no brush and 20 feet in open pasture. Types with density of ground cover varying from those stated above should have a width corresponding to their density.

Check Plot:

Check plots should be used to obtain additional information along the strip line. They should be located only in those places where Ribes are found or where Ribes have been destroyed. Whereas the purpose of the strip line is to first seek out Ribes areas and then obtain information on the efficiency of eradication, the purpose of the check plot is solely to obtain information on efficiency.

Check plots should be uniform in size and in units of 1/4 acres.

This will standardize all plots, facilitate office work, and make the information better understood.

The field application of these methods is shown by diagram below. Three strips are run thru an area with five types. The first strip starts in the northwest and runs eastward for 1125 feet. For 375 feet it is in dense brush where the width is four feet and the remainder is in pasture where the width is 20 feet. The portion of the strip in dense brush is plot 1, and that portion thru the pasture is plot 2. The other strips begin where the line of traverse changes. In the southeast corner a Ribes swamp was encountered and two additional plots were laid out to obtain more adequate information.

The Problem of Re-eradication

by

A. F. Amadon, State Leader, New York

When one engaged in blister rust work in New York State plans for a coming season's program of eradication on state land, the thought of the number of Ribes per acre is always before him - one hundred to the acre as an average and in some places two hundred to the acre. With such a large number to the acre before the land is first eradicated that an amount of sprout and seedling growth must be produced after a period of 3 or 4 years is another question that comes to mind. It is now five years since systematic eradication started in New York State and we must now stop and take account of stock. The problem of re-eradication has been coming on year by year and we have up to now, more or less, put it aside into our file of unfinished business. From now on it must be brought up to a par with eradica-

tion as far as importance is concerned.

We do not feel safe as far as a piece of white pine land is concerned if we know it has been poorly eradicated. We must also feel somewhat unsafe if we do not get some information as to how much "stuff" is coming back from sprouts and seedlings on eradicated land. In different areas in New York State some data has been obtained during the last two years. In one instance a 1/4 acre plot was laid out along a wall that in 1918 was covered with skunk currants. A job of complete eradication was done here and in 1921 not a Ribes could be found. In the same town several quarter acre plots were laid out and from 3 to 10 Ribes were found in these plots. These were sprouts and had an average of 6 ft. of leaf bearing stem. There were other Ribes found, also bushes missed originally, and what new infections we found were traced to the bushes missed rather than to the sprout growth.

In 1921 - 264 acres of land that had previously been eradicated in 1918 was re-eradicated and a record made of what was removed. The Ribes removed were classed as missed - sprouts and seedling growth and the feet of leaf bearing stem was recorded. Over these 264 acres - 1639 Ribes were found - 501 or 31 percent were bushes missed in original work - 673 or 4 percent were sprouts and 465 or 28 percent were seedlings. The average height per bush was 15.6 inches and the average leaf bearing stem per bush was 2.4 feet. There is no record of the original leaf bearing stem removed but the record of bushes pulled over this area originally shows 9,033 of large size. It is fair to say that the leaf bearing stem originally averaged 10 feet to the bush which would make an original amount of 90,330 feet of leaf bearing stem removed the first time over. By our figures, 2,731 feet of leaf bearing stem have come in from sprouts and seedlings in 3 years or an amount of 3 percent of the original leaf bearing stem removed. According to the missed bushes

found on this re-eradication, 95 percent of the original Ribes were removed the first time over. Originally there were 40 Ribes to the acre. From 1918 to 1922, 6 Ribes to the acre had come back as either sprout or seedling growth. The forest cover on this land is hardwood with very scattering pine from 10 to 15 feet high. There is a question whether this land needed re-eradication. The work was done here for the purpose of finding out what had come back here and not because of any real need of re-eradication. I have in mind another piece of land at Lake George which was eradicated in 1918. A large part of this area is pasture land with the pine occupying probably 75 percent of the land area. The rest of the land is taken up with open places, there being numerous stone walls running through the area. The pine trees are the scrubby field type ranging from 5 to 20 feet high. Last year I noticed numerous newly infected side branches. In nearly all cases I found a Ribes close by. These Ribes were (except in one case) sprout or seedling growth. Where they grew in the walls or open places they were thrifty young bushes but when shaded they were small weaklings. Walls are very difficult places to eradicate. The branches break off at the root crown in the walls and it is seldom that good eradication is done along walls. Birds are a means of dissemination of seed and through this agency many seeds are dropped into the walls. It is safe to say that on land where there are stone walls that re-eradication should be done at the end of 3 or 4 years.

In New York State we feel that this season we must run several Ribes survey lines on areas previously eradicated and obtain more complete data regarding how much growth is coming back in and under what forest types the sprout and seedling Ribes make the best growth.

In New York State our problem of Ribes re-eradication will differ in the varied sections of the state. I don't believe we can adhere to any hard

and fast rule as regards the problem of re-eradication. In some of the eastern states and in certain districts in New York State where the number of Ribes to the acre are few at the time of the original eradication, I don't believe re-eradication will be much of a problem. In areas however, where they run 100 to the acre or over I believe the problem of re-eradication to be a hard and real one.

It is now five years since we started eradication on a large scale and we have now had enough lapse of time to determine by field studies what has actually happened in the field and we can from now on take up intelligently the problem of re-eradication.

Forest Practice as Influenced by the White Pine Blister Rust

by

R. G. Pierce, Office of Blister Rust Control,

United States Department of Agriculture

The control of the blister rust is associated intimately with silvicultural practices. The following points are brought out, more for discussion, than as solution of all forest problems in connection with the raising of white pine as a timber crop.

Size of Stand.

From the standpoint of cost of Blister Rust Control per acre covered in eradication, the larger the area of white pine in a block, the less the cost of protection. In the protection of a one acre pine woods, in the center of brush area, it would be necessary, if we covered an area extending 900 feet from the pine, to work a total area in the protective zone of approximately 74 acres, or 74 times the pine area to be protected. Whereas,

in a township 6 miles square containing 23,040 acres the protective strip 900 feet wide is only 1/9 of the area protected, while in an area 50 miles square the protective zone outside is but 1/72 of the area protected.

The future of blister rust control will be protection on a community basis rather than on the acre basis. On this basis the protective strip becomes of much less concern than around a few acres. Since white pine is the most valuable tree for many sites in the North East, this species will become more and more used and larger areas of contiguous pine will probably result.

Density of Stand.

In Ribes territory, even under the densest of pine stands, Ribes may be found. The bushes however are usually small, weak, and with few leaves in the case of gooseberries, but are larger in the case of skunk currants. Their infecting power is small as compared to bushes grown in the pastures or openings in the dense pine. From a blister rust standpoint it is advisable therefore to maintain a dense stand throughout the life of the forest.

Cooper and Brierley show in their Ecological Study of Ribes in 1920, that gooseberries occur most commonly and bear most fruit and are most generally infected in orchards and pasture communities; that they are less common and with less infection in mixed woodland; and least in number and in infection in the climax forest.

When the stand is to be opened up by thinnings or at the final cut the area should be worked and all Ribes removed just before these operations. If Ribes were not removed they would recover quickly under better light conditions, and would become sufficiently large to menace the pine, especially the young seedlings.

Desirability of Conversion of Mixed Hardwood and Pine to Pure Pine Forest.

Mixed stands do not yield as much timber as pure pine. Fisher and Terry show a yield of well-stocked, natural pine stands as based on mill figures, from 40,000 to 55,000 feet per acre at 60 years. For mixed stands of same age the yield varies from 20,000 to 35,000 feet per acre.

This conversion to pure pine forests is desirable from a blister rust standpoint. Since the forest cover is usually much denser in pure pine, less light is admitted and Ribes growth discouraged.

It is believed that fewer re-eradications will be necessary in pure pine than in mixed hardwood and pine, since there is less fruit formed on Ribes in the pure pine, therefore less reproduction of seedlings.

Supplemental Planting Needed.

The planting of white pine on poorly stocked areas should immediately follow Ribes eradication. These poorly stocked areas adjoin good areas of pine forest and are necessarily included in the area worked.

If advantage is not taken by the owner and the state, of the fact that pine areas are being cleared of Ribes, which are not fully stocked, hence not producing the maximum of timber, then the costs of blister rust control are going to be higher than they should be, considering as a basis of cost, not per acre covered, but per acre of growing pine protected.

Choice of Site.

In the formation of plantations it would be the best practice to decide first which lands are white pine lands and which most suitable for spruce or other species. Then in the spring, prior to planting, after the Ribes have begun to leaf, a fairly intensive Ribes survey should be made of the planting site. Swampy areas or other areas may be found where experience has shown that Ribes cannot be removed economically. These areas adjoining

such swamps should then be planted to other species than white pine. When it has been decided to plant white pines upon a particular area in a blister rust infected region, eradication of the Ribes should certainly precede the planting. An instance of the results of planting before eradication is cited. At North Hudson, New York, a plantation of white pine was made in 1919, the Ribes not being destroyed till 1920. In 1921 an examination showed 15.1% of the living trees infected or 11.2% of all the trees set out, infected in the course of but two years.

Not only should this intensive Ribes survey of a planting site be made by the owner, but an extensive Ribes survey of the state would be advisable. This would reveal areas where Ribes are absent; where present and possible of eradication; and where present and eradication not practicable. White pine would then not be recommended on the latter type of land.

SUMMARY:

1. Ribes eradication over large contiguous areas will encourage production of white pine in larger blocks of dense pure stands which in turn will result in lower cost of control per thousand feet of pine lumber produced.

2. Supplemental planting of white pine on poorly stocked areas and the conversion of mixed stands to pure pine will result in a higher yield of good quality timber besides affording conditions less favorable for Ribes growth.

3. An extensive Ribes survey will result in greater care being used in selecting planting sites so that the species used will be produced at greater profit.

NEW HAMPSHIRE COLLEGE
R. D. Hetzel, President
AGRICULTURAL EXPERIMENT STATION
J. C. Kendall, Director

Durham, N. H.
February 20, 1923.

Mr. S. B. Detwiler,
Bureau of Plant Industry,
U. S. Department of Agriculture,
Washington, D. C.

Dear Detwiler:

I regret that illness has prevented my complying earlier with Mr. Filler's request for a summary of what I said at the dinner on February 8.

In brief I had two ideas which I tried to get across. The first was that the use of land for growing trees is a comparatively recent one and runs directly counter to all previously accepted standards and prejudices. Even after five thousand years of experience the tendency for most people is to use land either for tillage or pasture. Consequently any attempt to encourage the growing of trees as a crop must take into consideration the inherited prejudices to be overcome.

With reference to compound interest foresters have undoubtedly been too honest. Other forms of land use do not give consideration to compound interest and it seems therefore unlikely that forestry will get a fair hearing until its expenses and returns can be put in terms of periods not longer than five years. In other words, we should quit talking about timber as a long time crop and emphasize the fact that it can be made an annual crop if sustained yield is attained.

Very truly yours,

(Signed) K. W. Woodward

Forester.

Management of White Pine

by

H. O. Cook, Chief Forester, Massachusetts

The bulk of our present day stands of white pine are pure in type and of course upon abandoned fields and pastures.

In the future we are likely to find this type becoming less and less common and confined to artificial plantations, for except on sandy and gravelly soil, when pine is cut off, the land does not reproduce to pine, but frequently only to hardwood, or at best, to a mixture of the two.

Over a large part of central New England the ultimate natural type is the mixed one and the forester should work with nature rather than against it, by making this type as valuable as possible.

By filling in planting and by the elimination of weed species of hardwoods not only can the percentage of conifers be increased, but the better hardwoods can be encouraged and they have considerable potential value. Pierce states that pure pine stands retard the spread of blister rust because the dense shade of heavy pine stands kills out the ribes. I am not sure but what some compensating protective factors will be found in a mixed stand of hardwoods and pine. Certainly there is an insurance of future values in the mixed stand that the pure stand does not possess.

Another important factor in the maintenance of valuable forest types is the cutting over of only small units. In view of the methods of wholesale logging in other sections of the country one might think it strange to say that one of our woodlots which average about 50 acres, is too large a unit to cut off for the well being of the forest, yet it is generally the case that when more than four or five acres are cut in one unit the forest type deteriorates and reproduction of pine is almost always lacking.

To make it practical to log in small units, we must get away from the use of the portable mill and substitute the stationary saw-mill, to which the farmer can haul at any time a few logs cut from a small area of mature growth.

Observations on the Management of White Pine With Special Reference to Reproduction Methods Used on the Harvard Forest at Petersham, Massachusetts.

by

Prof. J. Nelson Spaeth, Assistant to the Director, Harvard Forest, Petersham, Massachusetts.

The ease with which white pine reproduction may be secured varies greatly with the character of the soil. Of the many factors, climatic and edaphic, influencing the timber growing ability of a given location none has so great an effect on the reproduction of pine as the character and composition of the soil and the resulting soil moisture conditions.

On what has often been called, "natural pine land" namely, dry to fresh sandy or gravelly soils, the reproduction of pine stands is relatively simple. Any one of several standard methods of management may accomplish the desired result. Perhaps the most widely known is that of leaving a few (3-10) heavy crowned wind firm trees per acre, evenly distributed, or in groups. If on narrow strips or in small groups all the trees are removed a good reproduction of pine often results. In 1913-1914 at Petersham an area of pine was clear cut and no advanced growth (small pines under the merchantable trees) being present planting was thought to be necessary.

Accordingly, as an experiment, spruces were set out on the area. A few years later there were large numbers of small but very thrifty white pines (many more than were needed for a future pine stand) on the southern portion. Their origin was obviously seed blown from trees on the edge of the cutting. The explanation of their thrifty condition was the lack of vigorous hardwood competition and an examination of the soil showed the southern portion to be a rapidly draining gravel esker, - sufficient explanation for the comparatively slow growth of hardwood. In the case of another clear cut area, made several years previous, on which it was hoped there might be good reproduction of pine from heavy crowned, thrifty trees on the margin of the cutting there is not a single seedling available for the new crop. Undoubtedly more pine seed fell on this second area, subsequent to the cutting, than on the first area. The explanation of the lack of pines in the new crop lies in the fact that the soil, which is deep, rich and fertile, caused a rank growth of hardwood sprouts too dense for the survival of pine seedlings. Where small groups of merchantable trees with intermediate groups of young growth occur on "natural pine land" the plan of cutting the mature groups, leaving clumps of near merchantable trees, which will seed in the area, is likely to give satisfactory results, due primarily to the lack of hardwood competition on this class of soils. Clear cutting a pine stand in the winter following a heavy fall of seed often results in abundant pine reproduction.

Due to the abandonment of farms which started at the time of the Civil War and was augmented by the development of manufacturing on the waterpower sites along the railroads, and to the opening up of the West, many of the present mature and nearly mature pine stands are on areas not naturally pine land. The presence of open-grown, isolated pines in pas-

tures and along the road sides, furnishing seed relatively light and easily carried by the wind, is responsible for the establishment of pine rather than oak, cherry, basswood and chestnut on abandoned land favorable to the growth of hardwood. These same hardwood species appear as advanced growth under the pine stands when, after it reaches forty-five years of age, the crown canopy opens up to some extent, admitting more light to the forest floor.

A large percentage of the area of the Harvard Forest is natural hardwood land where, as nearly as we can determine, the primeval forest was composed of hardwood trees with only here and there a veteran pine rearing its head above the general level of the forest canopy. Indications are that if left to herself nature would gradually restore this condition, the climax forest. Because of the demand for softwood lumber, white pine in particular, our present great problem is to secure pine reproduction where hardwood is nature's choice. Opposing nature is expensive. Any method of reproducing pine on hardwood land costs money. The choice of method often depends on the relative cost which is generally less if the more valuable portion of the natural hardwood reproduction is accepted with an attempt thru management to secure with this a goodly portion of pine, using the mixed forest of pine and hardwood in favor of which there are several arguments. It is generally accepted that the highest quality of second growth pine lumber comes from mixed stands. Furthermore, in the case of mixed stands no one pest such as the blister rust is likely to kill the entire crop. Growing large areas of a single species is, "putting all the eggs in one basket", the destruction of the chestnut by blight, of Larch by the slawfly, and of spruce by the budworm are examples of the possible disastrous results. The growing of pure white pine

in large blocks might greatly reduce the cost of protecting against blister rust, but I doubt whether it would be a wise policy.

During the course of his twelve years of work at Petersham, Professor Fisher has developed a method of securing a large proportion of pine in mixture with the hardwood reproduction on the more fertile soils. It consists in removing the mature stand in two cuts with a subsequent weeding of the new crop. The first cut is made from five to seven years before the age determined for the complete removal of the stand. This removes, in addition to all of the dead and dying trees, a sufficient number of the dominant to materially open up the crown canopy, giving the remaining trees an opportunity to extend their crowns. A stimulation of seed production results. The partial decomposition of the needle litter of the forest floor brought about by increased light, makes a more favorable seed bed. The two or three seed years, which will occur during the seven years that elapse before the final or clear cutting of the area, produce an abundant advance growth of pine seedlings not less than 5,000 and, under favorable conditions, sometimes 25,000 per acre. The final cutting, which takes all of the remaining trees, is best made on snow to avoid excessive damage to reproduction. If, as is usually the case, there is an abundance of young hardwood growth with the pine seedlings under the mature stand, this is cut back almost to the ground with a bush-scythe before the final cutting is made, in order to give the pine a better start in competition with the hardwood. Care must be taken not to cut too low, thus moving off the tops of the young pines. The cost is more than justified by the saving of the choppers' time as they habitually cut the underbrush near a tree preparatory to felling it. Brush burning is essential if the entire growing capacity of the area is to be utilized for the new crop as the

windrows of brush occupy at least 30% of the area after a logging operation. Occasionally brush burning may be carried on during the logging by keeping fires going near the choppers. More often the slash is not disposed of at the time of logging but is burned in small piles as soon as weather conditions are favorable in the Spring. The cost ranges from 15¢ to 70¢ per thousand feet of logs cut. The more dense the stand the less the volume of slash per thousand feet, and the cheaper the cost of burning. 30¢ per thousand may be considered an average figure for fairly dense stands. This is a cost to be charged against the new crop. The other costs are those incurred in weeding during the first ten years. The hardwood sprouts grow much more rapidly than pine seedlings and if undisturbed would soon choke them out. Certainly two, and often three, weedings are necessary to insure the pines a permanent place in the new crop. These weedings or cleanings consist in cutting back the more vigorous hardwoods, freeing the thrifty pines. Only those hardwoods, which shade pines, need be cut. It is much better to cut partly through the hardwood stems, at a convenient height above the ground lopping them over to die slowly from lack of light, than to completely sever the stems near the ground, which results in a vigorous sprout. If the method of lopping is practiced, the cost is less and the effect more lasting. When logging operations are carried on annually, as at Petersham, the necessity of removing the crop in two cuttings entails little or no additional expense. The costs of the new crop are the expense of brush burning and the charges for weeding, together amounting to from $10.00 to $18.00 per acre. In the case of isolated wood lots economic necessity often requires that the entire stand be removed at one cutting. Where this is necessary brush burning and planting may be substituted for the method outlined

above. When planting stock is available at moderate cost, as from State Forest Nurseries, the cost of planting is not prohibitive. An insect pest, the Hylobius Beetle, is injurious to stock planted on freshly cut over pine land. Attracted by the smell of pitch these beetles migrate to the cutting area in the Spring immediately following logging and breed in the stumps. They feed on the tender bark of small pines. After two Summers, when the pine stumps become dry and are no longer favorable breeding places, the beetles disappear. The natural pine reproduction resulting from the two cut system is so abundant that even after the beetles have eaten their fill, killing as high as 60% of the seedlings, there are more than enough left. In planting an area, however, it is best to wait two years until the beetles have gone. By this time the hardwood advance growth will be well started and the more valuable species can be easily recognized. Comparatively few -400 to 600- pines per acre planted in the most favorable spots, where the hardwood growth is thin or of poor species, will establish the same kind of a mixed stand as is obtained by natural reproduction. The process and cost of weeding the planted area are about the same as given above for the two cut system.

Resolution

Prof. Woodward of the N. H. State College, suggested a resolution to widen the scope of the blister rust agents' educational work to include forestry. A committee was appointed by the acting chairman, Mr. Dana, to draw up a resolution (Committee: Chairman, W. O. Filley, Conn., J. D. Willard, Mass., and Prof. K. W. Woodward, N. H.) The committee presented the following resolution which was unanimously approved by all the state cooperators and leaders.

RESOLUTION

Recognizing that the work of the County Blister Rust Agents under the Bureau of Plant Industry not only affords an excellent and only partially utilized opportunity for carrying information in forestry to the people, but also that their blister rust work will be greatly strengthened if they are able to advise on other phases of forest management; and further recognizing the limitations as to extension work in forestry necessarily imposed by the appropriation under which they are at present employed.

We, the State Cooperators, State Leaders, and others interested in blister rust control, meeting in Boston, February 8 & 9, 1923, believe that the sources of financial support for the employment of such agents should be broadened, and the scope of their activities expanded so that they may be in a position to aid in the development of forestry to the fullest possible extent; and we urge the Northeastern States Extension Conference to be held in New Haven, Feb. 21 - 24 to give this matter thorough consideration.

W. O. Filley,

Chairman.

Miscellaneous

State Leaders and Cooperators favored a state school for educational agents to be held in March. Value of school will result in get together of the men and the mutual exchange of ideas. Federal men will help out in any way desired.

New Hampshire	-	any time after March 13
Vermont	-	last of March
Mass., R. I. & Conn.	-	first part of March
Maine	-	last part of March
New York	-	last of March or 1st of April

Mr. Taylor of New York suggested Agricultural agents (in counties where blister rust control agents are working) come to the Blister Rust school for one day.

The Washington Office will furnish agents with -

1 - Window display racks

2 - Additional and revised sales books

3 - Newsy news letters

4 - Field library publications

5 - Statistics and tabulations for field consumption

E. C. Filler,

Secretary.